



Project:	Drumheller Institutional & Residential Demolitions Project		
Addendum No.:	04	No. of Pages	100
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The following change(s) to the Tender Documents are effective immediately. This Addendum forms part of the Contract Documents.

4.1 QUESTIONS:

- 1. Question:** The Hazardous Materials Assessment provided by Pinchin Environmental for the old Health Centre identifies approximately 34,000 sf of drywall with asbestos containing mud within the building separate from the asbestos “pucks” on drywall. We did not see any amount of drywall that could account for this 34,000 sf identified in the assessment. Please confirm if this drywall might have been removed prior to our site visit and if we should allow for this material abatement within our quote or qualify it as not included?

Answer: The hazmat consultant has advised that after reviewing all the photos from site, the 34,000sf also includes the drywall joint compound pucks (these are DJC that is used as an adhesive to bond gypsum board to concrete/block wall structure) on the concrete walls, not gypsum board with compound. Furthermore, it was clarified that samples no. S0010 ABCDEFG and no. S0018 ABCDE are both for the same materials, just different sample sets to break up areas in the building.

4.2 APPENDIX UPDATE:

- 1. Delete** APPENDIX I – ADDITIONAL SPECIFICATIONS in its entirety and **substitute** with the attached APPENDIX I – ADDITIONAL SPECIFICATIONS R1.

APPENDIX I – ADDITIONAL SPECIFICATIONS R1

Part 1 SAFETY

1.1 SAFETY REQUIREMENTS

- .1 Comply with and enforce the construction safety measures required by the Alberta Building Code, the Workers' Compensation Board, and applicable provisions of Federal, Provincial, and Municipal safety laws and ordinances.
- .2 Adhere to all Provincial Occupational Health and Safety Act regulations for the safety of the public and of workers at all times.
- .3 For the purposes of this Act, the General Contractor is deemed to be the "Prime Contractor". Post appropriate notice on the site as required.
- .4 Assume full responsibility for the safety and organization of the work. The Project Manager nor Owner do not direct, supervise or assume control over the means, methods, techniques, sequences, or procedure of construction.
- .5 In the event of conflict between any provisions of above authorities, the most stringent provision will apply.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within [7] days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site-specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit one copy of Contractor's authorized representative's work site health and safety inspection reports to Owner weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS Safety Data Sheets (SDS) in accordance with applicable regulations.
- .7 Owner will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within [7] days after receipt of plan. Revise plan as appropriate and resubmit plan to Owner within [5] days after receipt of comments from Owner.
- .8 Owner's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to *commencement of Work*, and *submit additional certifications for any new site personnel to Owner*.
- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Contractor shall be responsible and assume the Prime Contractor role for each work zone location. Contractor shall provide a written acknowledgement of this responsibility with 3 weeks of contract award.

- .3 Work zone locations include:
 - .1 Abandoned Health Centre
 - .2 Consortium
 - .3 Nacmine Hotel
 - .4 25 Roper Road
 - .5 109 4 Street
- .4 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.4 SAFETY ASSESSMENT

- .1 Perform site-specific safety hazard assessment related to project.

1.5 MEETINGS

- .1 Schedule and administer a Health and Safety meeting with Owner prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Regulatory Requirements.

1.7 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Asbestos-containing building materials
 - .2 Lead paint and lead-containing products
 - .3 Mercury in fluorescent light tubes and thermostat ampules
 - .4 PCBs in light ballasts
 - .5 Mould and water impacted building materials
 - .6 Bird droppings
 - .7 Silica in building materials

1.8 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Owner may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site, and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

- .2 Contractor will be responsible and assume the role of Prime Contractor as described in the Alberta Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation for the Province of Alberta.
- .2 Comply with Occupational Health and Safety Regulations, 1996.
- .3 Comply with Canada Labour Code and Canada Occupational Safety and Health Regulations.

1.11 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Owner verbally in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
 - .1 Have site-related working experience specific to activities associated with demolition.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work.

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Owner.

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Owner.
- .2 Provide Owner with written report of action taken to correct non-compliance of health and safety issues identified.

- .3 Owner may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 *BLASTING*

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Owner.

1.16 *POWDER ACTUATED DEVICES*

- .1 Use powder actuated devices only after receipt of written permission from Owner.

1.17 *WORK STOPPAGE*

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 General: Provide selective site demolition, in accordance with the requirements of the Contract Documents.
- .2 Section includes descriptions for demolishing, salvaging, recycling, and removing site work items identified for removal in whole or in part, and for backfilling resulting trenches and excavations.

1.2 REFERENCE STANDARDS

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .2 Transport Canada:
 - .2 Transportation of Dangerous Goods Act, (TDGA), c. 34.

1.3 DEFINITIONS

- .1 Owner: The Town of Drumheller.
- .2 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- .6 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or the environment if handled improperly.

1.4 QUALITY ASSURANCE

- .1 Perform work of this Section in accordance with referenced standards and applicable Federal, Provincial, and Municipal regulations.

1.5 *PROJECT MEETINGS*

.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Owner.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting [4] days in advance of meeting date to Owner.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within [3] days after meetings and transmit to meeting participants, affected parties not in attendance, and Owner.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.6 *PRECONSTRUCTION MEETING*

- .1 Within [5] days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Owner, Contractor, major Subcontractors, field inspectors, and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum [5] days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Construction Progress Schedule.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with regulations.
 - .5 Delivery schedule of specified equipment.

- .6 Site security.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Owner provided products.
- .9 Record drawings in accordance with Submittal Procedures.
- .10 Maintenance manuals in accordance with Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Closeout Submittals.
- .12 Monthly progress claims, administrative procedures, photographs, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.

1.7 *PROGRESS MEETINGS*

- .1 During course of Work and [2] weeks prior to project completion, schedule progress meetings weekly.
- .2 Contractor, major Subcontractors involved in Work and Owner are to be in attendance.
- .3 Notify parties minimum [3] days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within [3] days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.

- .11 Review proposed changes for affect on construction schedule and on completion date.
- .12 Other business.

1.8 *DELIVERY, STORAGE, AND HANDLING*

- .1 Coordinate the protection of the environment and establish adequate site controls.
- .2 Protect open excavations in accordance with the requirements of the Authorities having jurisdiction.
- .3 Protect existing site features to remain or identified for salvage or re-use; make repairs and restore to a similar condition to existing where damage to these items occurs as directed by the Project Manager and at no cost to Owner:
 - .1 Remove and store salvaged materials to prevent damage.
 - .2 Store and protect salvaged materials as required for maximum preservation of material.
 - .3 Handle salvaged materials the same as new materials.
- .4 Coordinate requirements for Waste Management and Disposal for materials being re-used or recycled:
 - .1 Divert excess materials from landfill to site.
 - .2 Separate materials identified for recycling. Place in identified containers in accordance with local Waste Management regulations.
 - .3 Place materials defined as hazardous or toxic in identified containers.
 - .4 Label location of salvaged material's storage areas and provide barriers and security devices.
 - .5 Ensure emptied containers are sealed and stored safely.
 - .6 Source separate for recycling materials that cannot be salvaged for re-use including wood, metal, concrete and asphalt, and gypsum.
 - .7 Remove materials that cannot be salvaged for re-use or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.9 *SITE CONDITIONS*

- .1 ADMINISTRATIVE REQUIREMENTS
 - .1 Coordination: Coordinate with Owner for the material ownership including the following:

- .2 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- .3 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:
 - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
 - .2 Coordinate with Owner's historical adviser, who will establish special procedures for removal and salvage operations.
- .1 Pre-Demolition Meetings.
 - .1 Convene pre-demolition meeting [1] week before beginning work of this Section, with Contractor and Owner in accordance with Project Meetings to:
 - .1 Verify project requirements.
 - .2 Verify existing site conditions adjacent to demolition work
 - .3 Coordinate with other construction sub trades
 - .4 Examine existing site conditions adjacent to demolition work, prior to start of Work
 - .5 Waste reporting requirements
 - .2 Hold project meetings every week.
 - .3 Ensure key personnel, site supervisor, project manager, subcontractor representatives, and Owner attend.
 - .4 Contractor will provide written report on status of waste diversion activity at each meeting.
 - .5 Owner will provide written notification of change of meeting schedule established upon contract award [24] hours prior to scheduled meeting.
- .2 Scheduling:
 - .1 Employ necessary means to meet project timelines without compromising specified minimum rates of material diversion.
 - .2 In event of unforeseen delay notify Owner in writing.

1.10 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:

- .1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province, Canada as follows:
 - .1 Submit for review and approval selective site demolition drawings, diagrams or details showing sequence of selective site demolition.
 - .2 Submit in accordance with Submittal Procedures.
 - .3 Contractor is responsible for fulfilment of reporting requirements.
 - .2 Schedule of Selective Site Demolition Activities: Coordinate with Construction Progress Schedule - Critical Path Method (CPM), and indicate the following:
 - .1 Detailed sequence of selective site demolition and removal work, with starting and ending dates for each activity
 - .2 Interruption of utility services
 - .3 Coordination for shutoff, capping, and continuation of utility services
 - .4 Locations of temporary partitions and means of egress
 - .3 Construction Waste Management Plan (CWM Plan): Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction, and as follows:
 - .4 Proposed Dust Control and Noise Control Measures: Submit statement or drawing that indicates measures proposed for use, proposed locations, and proposed time frame for their operation.
 - .5 Inventory: Submit a list of items that have been removed and salvaged after selective site demolition is complete.
 - .6 Landfill Records: Indicate receipt and acceptance of all material removed from the site and disposed of at a landfill facility, including hazardous wastes by a landfill facility licensed to accept hazardous wastes.
 - .7 Pre-demolition Photographs: Submit photographs indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by selective site demolition operations.
- .2 Informational Submittals: Provide the following submittals when requested by the Owner:
- .1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including but not limited to, lists of completed projects with project names and addresses, names and addresses of Consultant for work of similar complexity and extent.

1.11 *QUALITY ASSURANCE*

- .3 Regulatory Requirements: ensure Work is performed in compliance with applicable Federal, Provincial, and Municipal regulations.
- .4 Comply with hauling and disposal regulations of Authority having Jurisdiction.

1.12 *SITE CONDITIONS*

- .5 Environmental protection:
 - .1 Ensure Work is done in accordance with Environmental Procedures.
 - .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Fires and burning of waste or materials is not permitted on site.
 - .4 Burying of rubbish waste materials is not permitted.
 - .5 Disposal of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers, is not permitted.
 - .6 Ensure proper disposal procedures are maintained throughout the project.
- .6 Pumping of water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties, is not permitted.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction or as directed by Owner.
- .8 Protect trees, plants, and foliage on site and adjacent properties where indicated.
- .9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .11 Owner may occupy another building immediately adjacent to demolition area.
- .12 Conduct selective site demolition so Owner's operations will not be disrupted:
 - .1 Provide not less than [72] hours' notice to Owner of activities that will affect operations.
 - .2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities:
 - .1 *Closing or obstructing walkways, exits, or other occupied or used facilities without written permission from Owner is not permitted.*
- .13 Owner assumes no responsibility for Selective Site elements being demolished:

- .1 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- .2 Before selective site demolition, remove, protect, and store salvaged items as directed by Owner:
 - .1 *Salvage items as identified by Owner.*
 - .2 *Deliver to Owner as directed.*

Part 2 Products

2.1 *EQUIPMENT*

- .1 Equipment and Heavy Machinery:
 - .1 Machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 *EXAMINATION*

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.
- .2 Owner does not guaranty that existing conditions are the same as those indicated in Project Record Documents.
- .3 Inventory and record the condition of items being removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Owner.
- .5 If necessary, engage a professional engineer to perform an engineering survey of condition of adjacent buildings to determine whether removing any site element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective site demolition operations.
- .6 Verify that hazardous materials have been remediated before proceeding with site demolition operations.

3.2 *PREPARATION*

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction and/or sediment and erosion control drawings and/or sediment and

erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction, whichever is more stringent.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of in-place conditions:
 - .1 Work in accordance with Environmental Procedures and Erosion and Sedimentation Control Plan and Stormwater Pollution Prevention Plan.
 - .2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades properties parts of existing building to remain.
 - .1 *Provide bracing, shoring and underpinning as required.*
 - .2 *Repair damage caused by demolition as directed by Owner.*
 - .3 Support affected site elements and, if safety of site element being demolished or adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Owner.
 - .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.
- .3 Surface Preparation:
 - .1 Notify and obtain approval of utility companies before starting demolition.
 - .2 Disconnect and re-route electrical and service lines within the site to be demolished.
 - .1 *Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of selective site demolition.*
 - .3 Disconnect and cap designated mechanical services.
 - .1 *Natural gas supply lines: remove in accordance with gas company requirements.*
 - .2 *Sewer and water lines: remove to property line in accordance with authority having jurisdiction and/or as directed by Owner.*
 - .3 *Other underground services: remove and dispose of as directed by Owner.*
 - .4 Disruption of active or energized utilities designated to remain undisturbed is not permitted.

3.3 REMOVAL AND DEMOLITION OPERATIONS

- .1 Remove items as indicated.

- .2 Disruption of items designated to remain in place is not permitted.
- .3 Removal of pavements, curbs, and gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Owner.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials.
- .4 Excavate at least [300] mm below pipe invert, when removing pipes under existing or future pavement area.
- .5 Decommission water wells and monitoring wells in accordance with Municipal and Provincial guidelines regulations.
- .6 Remove designated trees during demolition.
 - .1 Obtain written approval of Owner prior to removal of tree not designated.
- .7 Stockpile topsoil for final grading and landscaping:
 - .1 Provide erosion control and seeding if not immediately used.
- .8 Salvage:
 - .1 Dismantle items containing materials for salvage and stockpile salvaged materials at locations as indicated.
- .9 Disposal of Material:
 - .1 Dispose of materials not designated for salvage or reuse on site at authorized facilities approved in Waste Reduction Workplan.
 - .2 Trim disposal areas to approval of Owner.
- .10 Backfill: Backfill in areas as indicated.

3.4 *STOCKPILING*

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage, and theft.
- .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 *REMOVAL FROM SITE*

- .1 Remove stockpiled material as directed by Owner, when it interferes with operations of project.

- .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .3 Transport material designated for alternate disposal using approved equipment listed in CWM Plan and in accordance with applicable regulations:
 - .1 Written authorization from Owner is required to deviate from CWM Plan.
- .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
 - .1 Disposal Facilities: approved and listed in Waste Reduction Workplan.
 - .2 Written authorization from Owner is required to deviate from disposal facilities listed in Waste Reduction Workplan.

3.6 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Remove debris, trim surfaces, and leave work site clean, upon completion of Work
 - .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools, and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with regulations.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .4 Perform selective site demolition work to prevent adverse effects to adjacent watercourses, groundwater, and wildlife, and to prevent excess air and noise pollution:
 - .1 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers; follow proper disposal procedures throughout the project in accordance with Authorities Having Jurisdiction.
 - .2 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Authorities Having Jurisdiction.
- .5 Protect existing site features and structures, trees, plants, and foliage on site and adjacent properties where required.
- .6 Remove contaminated or hazardous materials as defined by Authorities Having Jurisdiction from site, prior to start of selective site demolition Work, and dispose of at certified hazardous waste disposal facilities.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 General: Provide finishing, in accordance with the requirements of the Contract Documents.
- .2 This Section includes the following:
 - .1 Demolition and removal of buildings and structures.
 - .2 Demolition and removal of site improvements adjacent to a building or structure being demolished.
 - .3 Demolition and removal of concrete foundations and piles.
 - .4 Removing below-grade construction.
 - .5 Disconnecting, capping or sealing, and removing site utilities.

1.2 DEFINITIONS

- .1 Owner: The Town of Drumheller.
- .2 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.
- .5 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well-being or the environment if handled improperly.

1.3 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI):
 - .1 ANSI/ASSE A10.8, Scaffolding Safety Requirements
- .2 Canadian Federal Legislation:
 - .1 Canadian Environmental Protection Act (CEPA),
 - .2 Canadian Environmental Assessment Act (CEAA),
 - .3 Transportation of Dangerous Goods Act (TDGA),
 - .4 Motor Vehicle Safety Act (MVSA),
 - .5 Hazardous Materials Information Review Act,

- .3 Canadian Standards Association (CSA):
 - .1 CSA S350, Code of Practice for Safety in Demolition of Structures
- .4 National Fire Protection Association (NFPA):
 - .2 NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Materials Ownership:
 - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become the Demolition Contractor's property and shall be removed from Project site.
 - .2 Historic items and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:
 - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
 - .2 Coordinate with Owner's adviser, who will establish special procedures for removal and salvage.
- .2 Pre-Demolition Meeting: Conduct a pre-demolition meeting at Project site, as follows:
 - .1 Inspect and discuss condition of construction being demolished.
 - .2 Review structural load limitations of existing structures.
 - .3 Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - .4 Review and finalize protection requirements.

1.5 SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Schedule of Demolition Activities: indicate the following:
 - .1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity
 - .2 Interruption of utility services
 - .3 Coordination for shutoff, capping, and continuation of utility services
 - .4 Locations of temporary partitions and means of egress

- .2 Demolition Plan: Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction, and as follows:
 - .1 Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation.
 - .2 Inventory: Submit a list of items that have been removed and salvaged after demolition is complete.
 - .3 Landfill Records: Indicate receipt and acceptance of all materials removed from site and disposed of at a licensed landfill facility, including acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

- .1 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- .2 Refrigerant Recovery Technician Qualifications: Certified by Authority Having Jurisdiction.
- .3 Regulatory Requirements: Comply with Authority Having Jurisdiction's regulations before beginning demolition.
- .4 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
- .5 Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 SITE CONDITIONS

- .1 Environmental protection:
 - .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Fires and burning of waste or materials is not permitted on site.
 - .4 Do not bury rubbish waste materials.
 - .5 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .6 Ensure proper disposal procedures are maintained throughout project.
- .2 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction as directed by Town of Drumheller.
- .4 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .5 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .6 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
- .7 Buildings being demolished will be vacated and their use discontinued before start of Work.
 - .1 Owner will not occupy any other building immediately adjacent to demolition area.
 - .2 Conduct building demolition so Owner's operations will not be disrupted:
 - .1 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities.
 - i. Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from Authority Having Jurisdiction.
 - .3 Owner assumes no responsibility for buildings and structures being demolished:
 - .1 Conditions existing at time of inspection for bidding purpose will remain as-is.
 - .2 Before building demolition, Owner will remove any items applicable for own use, unless otherwise directed.
 - .4 Hazardous Materials: Please refer to Appendix for Hazardous Materials Reports.

Existing Hazardous Substances: Pinchin Ltd. and ECOABATE Environmental Solutions performed a hazardous substances assessment, and it is expected that hazardous substances will be encountered in the following work areas:

 - Abandoned Health Centre
 - Consortium Building
 - Nacmine Inn
 - 25 Roper Road
 - 109 4 Street
 - .1 Hazardous substances will be removed by a hazardous materials abatement specialist engaged by the Town of Drumheller before start of the Work.

.2

- .3 Discovery of Hazardous Substances not Identified in the Hazardous Materials Reports: Immediately notify Town of Drumheller if materials suspected of containing hazardous substances are encountered and perform the following activities:
 - .1 Hazardous substances will be as defined in the Hazardous Products Act.
 - .2 Stop work in the area of the suspected hazardous substances.
 - .3 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.
 - .4 Hazardous substances will be removed by hazardous materials abatement specialist engaged by the Town of Drumheller under a separate contract or as a change to the Work.
 - .5 Proceed only after written instructions have been received from Town of Drumheller.
 - .6 Examine reports to become aware of locations where hazardous materials are present.
 - .7 Storage or sale of removed items or materials on site will not be permitted.

Part 2 Products

2.1 TEMPORARY SUPPORT STRUCTURES

- .1 If required, design temporary support structures required for demolition work using a qualified professional engineer registered or licensed in the province of the Work.

Part 3 Execution

3.1 DEMOLITION FIRMS

- .1 Qualified Demolition Firms: submit documentation indicating demolition of similar projects (size and scope) within the last 5 years.

3.2 EXAMINATION

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.
- .2 Owner does not guaranty that existing conditions are the same as those indicated in Project documentation.
- .3 Inventory and record the condition of items being removed and salvaged.
- .4 When unanticipated underground mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to the Owner.
- .5 Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.

- .6 Verify that hazardous materials have been remediated before proceeding with building demolition operations. Refer to reports attached as an appendix of this package.

3.3 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
 - .4 Remove and dispose all materials according to regulations of Authority Having Jurisdiction.
- .2 Existing Utilities: Demolition Contractor is responsible for locating, identifying, disconnecting, removing, and sealing or capping the utilities lines prior to the demolition work commencing, following appropriate agencies' requirements. Locate, identify, disconnect, remove, and seal or cap off all utilities serving buildings and structures being demolished:
 - .1 Arrange to shut off indicated utilities with utility companies.
 - .2 If utility services are required being removed, relocated, or abandoned, before proceeding with building demolition provide temporary utilities that bypass buildings and structures being demolished and that maintain continuity of service to other buildings and structures.
 - .3 Cut off pipe or conduit a minimum of 610 mm (24") below grade.
 - .4 Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- .3 Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing:
 - .1 Remove refrigerant from air-conditioning equipment before starting demolition where required.
- .4 Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished:
 - .1 Strengthen or add new supports when required during progress of demolition.

- .5 Removed and Salvaged Items: Comply with the following:
 - .1 Clean salvaged items of dirt and demolition debris.
 - .2 Pack or crate items after cleaning.
 - .3 Identify contents of containers.
 - .4 Store items in a secure area until delivery to Owner.
 - .5 Transport items to Owner's storage area designated by Owner.
 - .6 Protect items from damage during transport and storage.

3.4 PROTECTION

- .1 Existing Facilities: Protect adjacent walkways, building entries, and other building facilities during demolition operations.
- .2 Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition.
- .3 When permitted by the Owner, items may be removed to a suitable, protected storage location during demolition [and cleaned] and reinstalled in their original locations after demolition operations are complete.
- .4 Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations:
 - .1 Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and Authority Having Jurisdiction.
 - .2 Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to Authority Having Jurisdiction.
 - .3 Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- .5 Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by Authority Having Jurisdiction and as indicated.
- .6 Temporary Facilities and Controls:
 - .1 Protect existing site improvements, appurtenances, and landscaping to remain.
 - .2 Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - .3 Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - .4 Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.

- .5 Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
- .6 Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise from occupied portions of adjacent buildings.

3.5 DEMOLITION, GENERAL

- .1 General: Demolish indicated existing buildings and structures and site improvements completely.
- .2 Use methods required to complete the Work within limitations of governing regulations and as follows:
 - .1 Blasting operations not permitted during demolition.
 - .2 Do not use cutting torches until work area is cleared of flammable materials.
 - .3 Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 - .4 Maintain adequate ventilation when using cutting torches.
 - .5 Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .3 Engineering Surveys: Perform surveys with the Engineer of Record as the Work progresses to detect hazards that may result from building demolition activities.
- .4 Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities:
 - .1 Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner or building manager and Authority Having Jurisdiction.
 - .2 Provide alternate routes around closed or obstructed traffic ways if required by Authority Having Jurisdiction.
 - .3 Use water mist and other suitable methods to limit spread of dust and dirt.
 - .4 Comply with governing environmental-protection regulations.
 - .5 Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.6 DEMOLITION, ACTUAL

- .1 Remove buildings and structures and site improvements intact when permitted by Authority Having Jurisdiction.
- .2 Proceed with demolition of structural framing members systematically, from higher to lower level.

- .3 Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- .4 Remove debris from elevated portions by chute, hoist, or other device that will convey debris to grade level in a controlled descent:
 - .1 Remove structural framing members and lower to ground by
- .5 Do not use flame-cutting torches unless otherwise authorized by Authority Having Jurisdiction:
 - .1 Transport steel trusses and joists as whole units without dismantling them further.
- .6 Equipment: Disconnect equipment at nearest fitting connection to services, complete with service valves; Remove as whole units, complete with controls.
- .7 Below-Grade Construction: Demolish foundation walls and other below-grade construction:
 - .1 Remove below grade construction, including basements, foundation walls, and footings, completely.
 - .2 For the Health Centre, Demolition Contractor shall cut off and remove all the piles to 3m below the current grades. On the remaining properties, the spread footings and any other foundation system shall be fully removed and disposed of.
- .8 Existing Utilities: Demolish existing utilities and below-grade utility structures.
- .9 Abandon Utilities:
 - .1 Fill abandoned utility structures with satisfactory soil materials.
 - .2 Piping: Disconnect piping at unions, flanges, valves, or fittings.
 - .3 Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.
- .10 Existing Utilities: Demolish and remove existing utilities and below-grade utility structures:
 - .1 Piping: Disconnect piping at unions, flanges, valves, or fittings.
 - .2 Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.

3.7 EXPLOSIVE DEMOLITION

- .1 Explosives: Perform explosive demolition according to governing regulations:
 - .1 Obtain written permission from Authority Having Jurisdiction before bringing explosives to, or using explosives on, Project site.
 - .2 Do not damage adjacent structures, property, or site improvements when using explosives.

3.8 SITE RESTORATION

- .1 Below-Grade Areas: Rough grade below-grade areas ready for future use. Excavation opening filled with compacted clean fill on 6-inch lifts at 90% PROCTOR density.
- .2 Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Approved and suitable material shall be placed as backfill in all excavated areas and graded to the elevation necessary to provide positive surface drainage to all areas of the site.
- .3 Provide a smooth transition between adjacent existing grades and new grades.

3.9 REPAIRS

- .1 General: Promptly repair damage to adjacent construction caused by building demolition operations.
- .2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.10 RECYCLING DEMOLISHED MATERIALS

- .1 General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible.

3.11 DISPOSAL OF DEMOLISHED MATERIALS

- .1 Except for items or materials indicated being recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill:
 - .1 Do not allow demolished materials to accumulate on-site.
 - .2 Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- .2 Burning: Do not burn demolished materials. Do bury demolished materials.
- .3 Disposal: Transport demolished materials off Owner's property and legally disposes of them.

3.12 CLEANING

- .1 Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations.
- .2 Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Related work specified elsewhere:
 - Section 02 82 00.01 Asbestos Abatement – Low Risk Precautions
 - Section 02 82 00.02 Asbestos Abatement – Moderate Risk Precautions
 - Section 02 82 00.03 Asbestos Abatement – High Risk Precautions
 - Section 02 83 10 Lead Abatement – Minimum Precautions
 - Section 02 83 11 Lead Abatement – Intermediate Precautions
 - Section 02 84 00 Non-Liquid Polychlorinated Biphenyl Abatement
 - Section 02 84 16 Mercury Abatement
 - Section 02 85 10 Silica – Minimum Precautions
 - Section 02 85 11 Silica – Intermediate Precautions
- .3 Site Conditions identifies all known hazardous building materials within the Project Area. The information provided is for general reference only. Each Contractor must confirm existing conditions on site prior to tender close.
 - .1 The specification fulfils the requirements of the Occupational Health and Safety Act, Regulation and Code.
- .4 The Outline of Work identifies the location, condition and quantities of hazardous building materials to be removed as part of this project.
 - .1 It is the intent that work prescribed this Section will result in the removal of all hazardous materials as outlined and the decontamination of all surfaces or materials which may have been or become contaminated by hazardous materials either during or prior to work of this Contract.

1.2 Site Conditions

- .1 Refer to the following reports:
 - .1 “Hazardous Building Materials Assessment (Pre-construction) Consortium Building, 601 – 4 Street East, Drumheller, Alberta”, Dated June 7, 2022, prepared by Pinchin Ltd., file number 309337.000
 - .2 “Hazardous Building Materials Assessment (Pre-construction) Abandoned Health Centre, 625 Riverside Drive East, Drumheller, Alberta”, Dated June 3, 2022, prepared by Pinchin Ltd., file number 309336.000
 - .3 “Hazardous Building Materials Assessment (Pre-construction) Nacmine Hotel, 5072 Hunter Drive, Drumheller, Alberta”, Dated June 22, 2022, prepared by Pinchin Ltd., file number 310252.000

- .4 “Hazardous Materials Assessment Report, 109 4 Street, Drumheller, Alberta”, Dated May 26, 2022, prepared by ECOABATE Environmental Solutions., file number E2718-B
- .5 “Hazardous Materials Assessment Report, 25 Roper Road, Drumheller, Alberta”, Dated May 26, 2022, prepared by ECOABATE Environmental Solutions., file number E2718-A

1.3 Outline of Work

- .1 Refer to the hazardous materials assessment reports provided for the extent of the Abatement Work Area(s).
- .2 Remove and dispose of the following materials as clean waste prior to hazardous materials abatement work without disturbing asbestos-containing materials:
 - .1 Carpet, thresholds, tack strips and underpad.
 - .2 Millwork and cabinets.
 - .3 Doors and door hardware.
- .3 Using procedures prescribed in the Sections identified in Related Work, remove and dispose of the following:
 - .1 All hazardous materials identified in the provided hazardous materials assessment reports.
- .4 Provide and pay for site inspection and air monitoring services specified herein.
- .5 Refer to Specification Sections identified in the Related Work for specified personnel protective measures for the safe handling, removal, clean-up, enclosure, or repair of hazardous materials in each phase or work area.
- .6 Visit the site prior to tender close to confirm the location and extent of any hazardous building materials or materials contaminated by hazardous materials.
- .7 Protect surfaces, building fabrics and items remaining within the Abatement Work Area.
- .8 Isolate the Abatement Work Area from adjoining Occupied and Non-Occupied Areas whether present at an interior or exterior location.
- .9 Maintain emergency and fire exits from Abatement Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.
- .10 Perform selective demolition of mechanical and electrical equipment, building components, materials and items scheduled for demolition at locations required to facilitate asbestos removal. Refer to Specification Sections identified in the Related Work for responsibility of demolition work and disposal.

- .11 Remove and dispose of as appropriate waste, building components, materials and items contaminated by hazardous materials that cannot be effectively cleaned.
- .12 Encapsulation will not be permitted where removal of building materials or structures scheduled for demolition will facilitate access to the asbestos materials in question.
- .13 Final clean work area to remove visible signs of asbestos and other hazardous materials, other debris or settled dust.
- .14 Apply lock-down agent to exposed surfaces throughout the work area and to surfaces from which any hazardous materials have been removed.
- .15 Unless otherwise specified, the handling, removal, clean-up or repair of hazardous materials or surfaces contaminated with hazardous materials is to be performed following wet removal techniques.

1.4 Schedule

- .1 Provide necessary manpower, supervision, equipment and materials to maintain and complete the project on schedule.
- .2 Work Hours:
 - .1 Normal Work Hours: 08:00 through 17:00 (Mon. - Fri.).
 - .2 Quiet Hours: As directed by the client.
- .3 Provide 48 hours written notice to the client of any request to work outside normal working hours. Obtain written approval before proceeding.

1.5 Definitions

- .1 Abatement Consultant: Owner's Representative providing inspection and air monitoring.
- .2 Abatement Contractor: Contractor or sub-contractor performing work of this section.
- .3 Abatement Work Area: Area where work takes place which will, or may, disturb hazardous materials.
- .4 Amended Water: Water with wetting agent added for the purpose of reducing surface tension to allow thorough wetting of materials.
- .5 Asbestos: Any of the fibrous silicates including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.
- .6 Asbestos-Containing Material (ACM): Material identified under Site Conditions including any debris, overspray, fallen material and settled dust.
- .7 Authorized Visitors: Building Owner, Abatement Consultant, or designated representative, and persons representing regulatory agencies.

- .8 Competent Worker: In relation to specific work, means a worker who is adequately qualified, suitable training and has sufficient experience to safely perform the work, either without supervision or with only a minimal degree of supervision.
- .9 Contaminated Waste: Material identified under Site Conditions, including fallen material, settled dust, other debris and materials or equipment deemed to be contaminated by the Abatement Consultant.
- .10 Curtained Doorway: Doorway consisting of two (2) overlapping flaps of rip-proof polyethylene arranged to permit ingress and egress from one room to another while permitting minimal air movement between rooms.
- .11 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit or vacuum using a Dispersed Oil Particulate (DOP) or Poly Alpha Olefin (PAO) HEPA filter leak test. This test is to be conducted on site where units are to be installed. Refer to ANSI/ASME N510-2007.
- .12 Fitting: Individual segments or pieces of a mechanical service line which may include but is not limited to the hangers, tees, elbows, joints, valves, unions, etc.
- .13 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.
- .14 HEPA Filter: High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
- .15 Lead-Containing Paint: A paint (or surface coating) in which the concentration of total lead exceeds 90 mg/kg (ppm or 0.009%) when a dried sample is tested in accordance with a method that conforms to good laboratory practices. This value is consistent with the federal definition of a lead-based paint outlined in the Surface Coating Materials Regulation (SOR/2016-193) under the Canada Consumer Product Safety Act; recognized by the Alberta Government.
- .16 Lead Waste: Waste generated from removal of lead-containing materials, or the substrate and paint finish where left intact.
- .17 Mercury Waste: Equipment, materials or items containing mercury or contaminated with mercury.
- .18 Milestone Inspection: Inspection of the Abatement Work Area at a defined point in the abatement operation.
- .19 Negative Pressure: A reduced pressure within the Abatement Work Area (>0.02 inches of water column) established by extracting air directly from Abatement Work Area and discharging it to exterior of building.
- .20 Non-Friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

- .21 Occupied Area: Any area of the building or adjoining space outside the Abatement Work Area.
- .22 Personnel: All Contractor's employees, sub-contractors' employees, supervisors.
- .23 PCBs: Monochlorinated or Polychlorinated Biphenyls (or any mixture of both).
- .24 PCB Material: Solid material containing PCBs at a concentration of more than fifty milligrams per kilogram (mg/kg) or 50 parts per million (ppm), or liquid with greater than 2 mg/kg or ppm.
- .25 PCB Waste: PCB Equipment, PCB Material, PCB Liquids and materials or items contaminated with PCBs.
- .26 PCM: Phase Contrast Microscopy.
- .27 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).
- .28 Restricted Area: A Restricted Area, as defined in the Alberta Occupational Health and Safety Code, is an area of a work site where there is a reasonable chance that the airborne concentration of asbestos exceeds or may exceed the Occupational Exposure Limit (OEL).
- .29 Toxicity Characteristic Leachate Procedure (TCLP): Laboratory analysis to determine leachable parameters in lead waste.
- .30 TEM: Transmission Electron Microscopy.

1.6 Regulations and Guidelines

- .1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications, the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.
- .2 Where regulations are not present, follow accepted industry standards and applicable Guideline documents. update this section.
- .3 Regulations and Guidelines include but are not limited to the following:
 - .1 Occupational Health and Safety Act, Regulations and Code, Province of Alberta.
 - .2 Alberta Asbestos Abatement Manual, Government of Alberta, Ministry of Labour and Immigration, 2019.
 - .3 Environmental Protection and Enhancement Act, Waste Control Regulation, Alberta Regulation 192/96.
 - .4 Alberta User Guide for Waste Managers, Alberta Environment, 1996.
 - .5 Guidelines for the Disposal of Asbestos Waste, Alberta Environment, 1989.

- .6 Transportation of Dangerous Goods Regulations SOR/2008-34, Transportation of Dangerous Goods Act.
- .7 PCB Regulations, SOR 2008-273, Canadian Environmental Protection Act.
- .8 Workplace Health and Safety Bulletin, Lead at the Work Site, Government of Alberta, Human Services, November 2013.
- .9 Best Practices: Mould at the Work Site, Government of Alberta, Employment and Immigration, Jul 2009.
- .10 Workplace Health and Safety Bulletin, Mercury at the Work Site, Government of Alberta, Employment and Immigration, January 2010.
- .11 Occupational Health and Safety Bulletin, Crystalline Silica at the Work Site, Government of Alberta, Employment and Immigration, November 2009.

1.7 Quality Assurance

- .1 Removal and handling of hazardous materials is to be performed by persons trained in the methods, procedures and industry practices for Abatement.
- .2 Ensure work proceeds to schedule, meeting all requirements of this Specification.
- .3 Complete work so that at no time airborne dust, visible debris, or water runoff contaminate areas outside the Abatement Work Area.
- .4 Any contamination of surrounding area (indicated by visual inspection or air monitoring) shall necessitate the clean-up of affected area, and in the same manner applicable to an Abatement Work Area at no cost to the Owner.
- .5 All work of this Section involving electrical, mechanical, carpentry, glazing, etc., shall be performed by licensed persons experienced and qualified for the work required.

1.8 Supervision

- .1 Provide on site, an Overall Superintendent(s), who has authority to oversee all aspects of the work, including but not limited to, estimating and negotiation of changes to the contract, update of submission requirements, scheduling, manpower and equipment requirements, and direct communication and co-ordination with Abatement Consultant and Owner's representative.
- .2 Provide on site, in addition to the Overall Superintendent(s), and for each work shift, a Shift Superintendent, who has authority regarding all aspects related to manpower, equipment and production.
- .3 Supervisory personnel must hold a provincial Occupational Health & Safety for the Asbestos Worker training card and have performed supervisory functions on at least five (5) other asbestos abatement projects of similar size and complexity.
- .4 At all times during work, the Overall or Shift Superintendent(s) must be on site. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the Owner.

- .5 Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Owner. Owner reserves the right to request replacement of supervisory personnel without explanation.
- .6 Do not replace supervisory personnel without written approval from the Owner.

1.9 Notification

- .1 Inform all trades on site of the presence and location of hazardous materials identified in the Contract documents.
- .2 Notify the Owner or Owner's Representative, and the Joint Work Site Occupational Health and Safety Committee, if suspected asbestos-containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.10 Submittals

- .1 Submit prior to starting work:
 - .1 Copy of the Asbestos Project Notification Acknowledgement form received from Alberta Occupational Health and Safety including the completed copy of the Asbestos Project Notification form (form WHS 3910).
 - .2 Workers' Compensation Board Clearance Certificate.
 - .3 Certificates of Insurance.
 - .4 Site specific work procedures.
 - .5 Copy of Company Health and Safety Policy and applicable programs.
- .2 Submit the following information regarding personnel prior to starting work:
 - .1 Resumes of the supervisory personnel.
 - .2 Valid Occupational Health & Safety for the Asbestos Worker training cards for all personnel who work within a high risk asbestos enclosure and/or a Restricted Area.
 - .3 WHMIS training certificates for all personnel.
 - .4 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.
 - .5 Proof, satisfactory to the Consultant, that all persons involved in the transport and disposal hazardous materials have been trained in accordance with the requirements of Federal and Provincial Transportation of Dangerous Good Acts and Regulations.
- .3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or hazardous materials abatement:
 - .1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.

- .2 Performance data on negative air units including DOP tests which must be performed on site immediately prior to initial usage, on a monthly basis, and when HEPA filters are changed.
- .3 DOP tests to be performed by an independent testing company.
 - .1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results, Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).
 - .2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.
 - .3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.
- .4 Proof of calibration of DOP testing equipment.
- .4 Submit the following prior to isolating the work area:
 - .1 Safety Data Sheets for chemicals or material used during the Abatement Project.
- .5 Submit the following upon completion of the work.
 - .1 A waste disposal statement of intent, documenting that asbestos waste will be disposed of in accordance with provincial requirements.
 - .2 Manifests, waybills, bills of lading etc. as applicable for each type of waste.

1.11 Insurance

- .1 Maintain a Commercial General Liability Policy with an insurance company acceptable to Pinchin Ltd. and OWNER. The intent of this policy is to hold Pinchin Ltd. and OWNER harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.
- .2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to Pinchin Ltd. and OWNER. The intent of these policies is to hold Pinchin Ltd. and OWNER harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.

- .3 Maintain a Pollution Liability Policy (or asbestos/lead liability policy or specific coverage under the CGL for asbestos/lead abatement) with an insurance company acceptable to Pinchin Ltd. and OWNER. The intent of this policy is to hold Pinchin Ltd. and OWNER harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations.
- .4 Forward all certificates to Pinchin Ltd. and OWNER before work is commenced, showing Pinchin Ltd. and OWNER as additional insured as their interest may appear.
- .5 Pinchin Ltd. and OWNER may request a certified true copy of the policies.
- .6 The limits will not be less than:
 - .1 Commercial General Liability \$5,000,000.00
 - .2 Automobile \$2,000,000.00
 - .3 Pollution Policy \$5,000,000.00

1.12 Inspection

- .1 Provide and pay for site inspection services as specified herein.
- .2 Retain the services of the Abatement Consultant to perform at a minimum, one (1) randomly scheduled site inspection per 8 hour work shift during all active removal, repair or clean-up of hazardous materials.
- .3 From commencement of work until completion of clean-up operations, the Abatement Consultant will be empowered by the Owner to inspect for compliance with the requirements of governing authorities, adherence to specified procedures and materials, and to inspect for final cleanliness and completion.
- .4 The Abatement Consultant is empowered by the Owner to order a shutdown of work when leakage of asbestos from the controlled work area has occurred or is likely to occur.
- .5 Any deviation from the requirements of the Specifications or governing authorities that is not approved in writing may result in a stoppage of work, at no cost to the Owner.
- .6 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions, and to provide performance to the level specified, shall be at no additional cost to the Owner.
- .7 Any inspections performed as a result of Contractor's failure to perform satisfactorily regarding quality, safety, or schedule, shall be charged additionally to the Contractor.
- .8 Facilitate inspection and provide access as necessary. Make good work disturbed by inspection and testing at no cost to the Owner.

- .9 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.
- .10 Provide 24 hours written notice to the Abatement Consultant of any request for scheduling of milestone inspections or transportation of waste through Occupied Areas.
- .11 The following Milestone Inspections may take place, at the Owner's cost, as outlined in each related specification section OR which will be confirmed at the initial start-up meeting:
 - .1 Milestone Inspection - Clean Site Preparation
 - .1 Inspection of preparations and set-up prior to contaminated work in the Abatement Work Area.
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .1 Inspection during hazardous materials removal, monitoring removal methods, site deficiencies, performing occupied air monitoring, etc.
 - .3 Milestone Inspection - Visual Clearance
 - .1 Inspection of Abatement Work Area after completion of all abatement, but prior to application of lock-down agents or dismantling of enclosure.
 - .4 Milestone Inspection – Clearance Sampling
 - .1 Air monitoring performed following removal of asbestos and application of slow drying sealer to ensure fibre levels inside the enclosure(s) are within the acceptable limits.
 - .2 Lead wipe sampling performed following removal of lead containing materials, cleaning and drying time to ensure lead concentrations on remaining are within the acceptable limits.
 - .5 Milestone Inspection – Dismantling Inspection
 - .1 Inspection of the Abatement Work Area and adjacent areas, following completion of all abatement and required air sampling, but prior to Contractor demobilization from the Site.
 - .2 Inspection of the Abatement Work Area and adjacent areas, following completion of all abatement and required air sampling, but prior to re-establishment of items.
- .12 Do not proceed with next phase of work until written approval of each milestone is received from the Abatement Consultant.

1.13 Air Monitoring - Asbestos

- .1 Provide and pay for air monitoring services as specified herein.
- .2 Retain the services of the Abatement Consultant to complete at a minimum, the following level of air monitoring:

- .1 Collection and analysis of one (1) PCM air sample at the perimeter of each separate Abatement Work Area once per 8-hour work shift during all active removal, repair or clean-up of asbestos-containing or asbestos-contaminated materials.
- .2 Collection and analysis of one (1) PCM air sample within the Clean Room of each Abatement Work Area once per 8-hour work shift during all active removal, repair or clean-up of asbestos-containing or asbestos-contaminated materials.
- .3 Collection and analysis of one (1) occupational (personal) PCM air sample within each separate Abatement Work Area once per 8-hour work shift during all active removal, repair or clean-up of asbestos-containing or asbestos-contaminated materials.
- .4 Collection and analysis of one (1) PCM air sample, per every 2,500 sq. ft., to be collected within each Abatement Work Area following the completion of all asbestos removal, repairs or clean-up, but prior to re-occupancy of the area by non-protected personnel.
- .3 Air monitoring will be performed using Phase Contrast Microscopy (PCM) following the National Institute for Occupational Safety and Health (NIOSH) Method 7400.
- .4 Co-operate in the collection of air samples, including providing workers to wear sample pumps for up to full-shift periods (occupational or personal samples). Contractor will be responsible for the cost of testing equipment repairs or resampling resulting from the actions of the Contractor's forces.
- .5 Results of PCM samples of 0.05 fibres per cubic centimeter of air (fibre/cc) or greater, outside an Abatement Work Area, or from within the Abatement Work Area during or following Glove Bag Work, will indicate asbestos contamination of these areas. Respond as follows:
 - .1 Suspend work within the adjoining Abatement Work Area until written authorization to resume work has been received from the Abatement Consultant.
 - .2 Isolate and clean area in the same manner applicable to the Abatement Work Area.
 - .3 Maintain work area isolation and repeat clean-up operations until visually inspected and air monitoring results are at a level equal to that specified.
 - .4 At the discretion of the Abatement Consultant provide additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas.
- .6 Results of 0.01 fibres per cubic centimeter of air (fibre/cc) or greater, collected within the Abatement Work Area enclosure after the site has passed a visual inspection, and an acceptable coat of lock-down agent has been applied, will indicate asbestos contamination of these areas. Respond as follows: enclosure after the site has passed a visual inspection, and an acceptable coat of lock-down agent has been applied, will indicate asbestos contamination of these areas. Respond as follows:
 - .1 Maintain work area isolation and re-clean entire work area. Then apply another acceptable coat of lock-down agent to exposed surfaces throughout the work

- area.
- .2 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified.
- .7 When results exceed 50% of maximum use concentration for the respirator being used within the Work Area, respond as follows: respond as follows:
 - .1 Immediately stop work within the Abatement Work Area.
 - .2 Instruct workers to exit the Abatement Work Area via the Worker Decontamination Facility while observing specified personnel exiting procedures.
 - .3 Contractor's forces shall not re-enter the Abatement Work Area for a period of 8 hours or until authorized by the Abatement Consultant.
 - .4 Upon re-entry to the Abatement Work Area, mist the air, any fallen debris or exposed surfaces with amended water using an airless sprayer.
- .8 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.
- .9 Cost of additional inspection and sampling performed as a result of elevated fibre levels in areas outside the Abatement Work Area or from within the work area following completion of work, will be back-charged to the Contractor.

1.14 Worker Protection

- .1 Instruct workers before allowing entry to the Low or Moderate Abatement Work Area. Instruction shall include training in use of respirators, dress, showering, entry and exiting from an Abatement Work Area, and all other aspects of work procedures and protective measures.
- .2 Workers must possess a valid Occupational Health & Safety for the Asbestos Worker training card prior to entry into a High Risk Abatement Work Area. Workers must not enter into a Restricted Area without a valid card.
- .3 Workers shall not eat, drink, chew gum or tobacco, or smoke in the Abatement Work Area.
- .4 Workers shall be fully protected at all times when possibility of disturbance of hazardous materials exists.
- .5 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Abatement Work Area.
- .6 Respiratory Protection
 - .1 Refer to each particular Section of the Specification for specified type of respiratory equipment specific to each phase or work area.
 - .2 Respirators shall be:

- .1 Used in accordance with the Occupational Health and Safety Code.
 - .2 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other organization acceptable in the provincial legislation.
 - .3 Selected and used in accordance with Canadian Standards Association (CSA) Standard Z94.4-11, Selection, Care, and Use of Respirators.
 - .4 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Abatement Work Area has facial hair which affects the seal between respirator and face.
 - .5 Assigned to a worker for their exclusive use.
 - .6 Maintained in accordance with manufacturer's specifications.
 - .7 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
 - .8 Repaired or have damaged or deteriorated parts replaced.
 - .9 Stored in a clean and sanitary location.
 - .10 Provided with new filters as necessary, according to manufacturer's instructions.
 - .11 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing.
 - .12 Instruction on proper use of respirators must be provided by a competent person.
- .3 Provide protective clothing, to all personnel which:
- .1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres or lead/silica dust.
 - .2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
 - .3 Once coveralls are worn, treat and dispose of as contaminated waste.
 - .4 Is replaced or repaired if torn or ripped.
- .4 Use hard hats, safety footwear and other protective equipment and apparel required by applicable construction safety regulations.

1.15 Visitor Protection

- .1 Provide clean protective clothing and equipment to Authorized Visitors.
- .2 Instruct Authorized Visitors in the use of protective clothing and Abatement Work Area entry and exit procedures.
- .3 Visitors may not enter a High Risk Abatement Work Area and/or a Restricted Area without a valid Occupational Health & Safety for the Asbestos Worker training card.

1.16 Signage

- .1 Asbestos Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 Caution: asbestos dust hazard.
 - .2 Access to the work area is prohibited except to authorized persons wearing protective clothing and equipment.

- .2 Lead Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is a lead dust, fume or mist hazard.
 - .2 Access to the work area is restricted to authorized persons.
 - .3 Respirators must be worn in the work area.
- .3 Silica Warning Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is a silica dust hazard.
 - .2 Access to the work area is restricted to authorized persons.
 - .3 Respirators must be worn in the work area.
- .4 Bins and Asbestos Waste Containers: Post signs on both sides of every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:
 - .1 CONTAINS ASBESTOS FIBRES
 - .2 Avoid Creating Dust and Spillage
 - .3 Asbestos May be Harmful to Your Health
 - .4 Wear Approved Protective Equipment.
- .5 Place placards in accordance with Transportation of Dangerous Goods Act.

1.17 Differential Pressure Monitoring

- .1 Provide and install differential pressure monitors as specified in each section.
- .2 Replace damaged or non-functional equipment at the request of the Abatement Consultant.
- .3 Record at minimum twice daily, and when damage to the enclosure is identified and repaired, the following information:
 - .1 Name of inspector.
 - .2 Date and time.
 - .3 Pressure reading.
 - .4 Repairs completed, if applicable.
- .4 Maintain specified differential pressure.
- .5 Stop contaminated work and take corrective action if pressure differential drops below the specified level. Notify the Abatement Consultant immediately.

1.18 Waste and Material Handling

- .1 Waste bins must be placed on grade or in receiving.
- .2 All bins for hazardous materials must be covered and locked when waste transfer is not being performed.
- .3 Ensure redundant non-ACM rubble, debris, etc. removed during contaminated work is treated, packaged, transported and disposed of as appropriate waste.
- .4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Abatement Work Area. Recycle metals.
- .5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Abatement Consultant for each individual type of material.
- .6 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.
- .7 Place all equipment, tools and unused materials that cannot be cleaned in Abatement Waste Containers.
- .8 As work progresses, and at regular intervals, transport the sealed and labelled waste containers from the Abatement Work Area to waste bin.
- .9 Place items in bins according to waste classification. Place asbestos waste, lead waste, metals, non-asbestos waste, etc. in separate bins.
- .10 Removal of waste containers and decontaminated tools and materials from the Abatement Work Area shall be performed as follows:
 - .1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Abatement Work Area. If the item can be cleaned, remove it from the site as clean waste.
 - .2 Place waste or item in Waste Container and seal closed.
 - .3 Wet wipe outside of Waste Container.
 - .4 Within Decontamination Facility, Transfer Room or at the perimeter of the Abatement Work Area, place in second Waste Container. Seal closed.
 - .5 Remove waste containers and transport to appropriate bin.
- .11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .12 Use Low Risk Procedures while transporting asbestos waste through facility.

- .13 Provide workers transporting waste with means to access appropriate personal protective equipment and all tools required to properly clean up spilled material in the case of a rupture of a Waste Container.
- .14 Pick-up and drop off of garbage bin shall be at pre-approved times and must not interfere with the Owner's operations.
- .15 Transport hazardous waste to landfill or waste transfer station in accordance with provincial requirements.
- .16 Cooperate with representatives of the provincial Ministry of the Environment and Parks and immediately carry out instructions for remedial work at the landfill, at no additional cost to the Owner.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to the Sections identified in Related Work for specified materials, equipment or facilities specific to each phase or work area.
- .2 Materials and equipment must be in good condition and free of debris and fibrous materials. Disposable items must be of new materials only.
- .3 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.
- .4 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of materials.
- .5 Asbestos Waste Container: A container acceptable to the landfill and the provincial Ministry of the Environment and Parks, that is:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Impervious to asbestos.
 - .4 Identified as asbestos waste.
- .6 Differential Pressure Monitor: a high precision instrument for measuring and controlling pressure differences in the low range, between the Abatement Work Area and Occupied Area. Calibrate regularly to manufacturer's instructions.
- .7 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter to equal negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.
- .8 Ground Fault Panel: Electrical panel as follows:
 - .1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in the Abatement Work Area.

- .2 Interrupters to have a 5 mA ground fault protection.
- .3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.
- .4 Openings sealed to prevent moisture or dust penetration.
- .5 Inspected by the Electrical Safety Authority.
- .6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.
- .7 Provide one Ground Fault Panel for each 5,000 square feet (500 square metres) of Abatement Work Area.
- .9 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Abatement Work Area and discharges the air to the exterior of the building. Equipped as follows:
 - .1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.
 - .2 Pressure differential gauge to monitor filter loading.
 - .3 Auto shut off and warning system for HEPA filter failure.
 - .4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.
- .10 HEPA Vacuum: Vacuum with necessary fittings, tools and attachments. Discharged air must pass through a HEPA filter.
- .11 Hose: Leak-proof, minimum bursting strength of 500 pounds per square inch (PSI) or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.
- .12 Lead Waste Container: An impermeable container acceptable to the landfill and the provincial Ministry of the Environment and Parks, that is:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Evaluated for leachable lead content and disposed of in accordance with applicable regulations.
 - .1 Where lead waste exceeds 5.0 mg/L of lead in the TCLP analysis, label as lead waste and dispose of as hazardous waste in a Class I landfill.
 - .2 Where lead waste is below 5.0 mg/L of lead in the TCLP analysis, disposed of as construction waste in a Class II landfill.
- .13 OSB: Oriented Strand Board.
- .14 Polyethylene Sheeting : 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.

- .15 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.
- .16 Protective Clothing: Disposable coveralls complete with head covering and full body covering that fits snugly at the ankles, wrists and neck.
- .17 Rip-Proof Polyethylene Sheeting: 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and two (2) layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps.
- .18 Shower Hose: Water lines for supply of hot & cold water to shower facilities to be rated for use at 200 PSI (1380 kilo pascals [kPa]) or twice the working pressure whichever is greater. Supply lines to be continuous and free of fittings, joints or couplings.
- .19 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.
- .20 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.
- .21 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

PART 3 EXECUTION

- .1 Refer to the Sections identified in Related Work for specified procedures for work area preparation, maintenance, site dismantlement, application of lock-down agent and all other procedures for the safe handling, removal and clean-up of hazardous materials specific to each phase or work area.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Low Risk procedures, as well as Pinchin and Owner specific requirements.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of asbestos.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section, including decontamination of the worker.
- .2 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
 - .1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
 - .2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.5 Inspections

- .1 Refer to Part 1.12 Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection

- .3 Milestone Inspection - Visual Clearance
- .4 Milestone Inspection – Clearance Sampling
- .5 Milestone Inspection – Dismantling Inspection

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

- .1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .3 Install polyethylene sheeting on openings in walls and floors (as required) and seal.
- .4 Install barriers and signage in clearly visible locations and in sufficient number to adequately warn of an asbestos dust hazard.
- .5 Provide power from ground fault interrupt circuits.
- .6 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .7 Without disturbing asbestos-containing materials, remove and dispose of non-hazardous materials as clean waste prior to asbestos removal work, where possible.

3.2 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Maintain Abatement Work Area in tidy condition.
- .4 Remove any standing water on polyethylene/floor at the end of every shift.
- .5 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Asbestos Removal - General

- .1 Do not use powered tools or non-hand-held tools.
- .2 Do not use compressed air to clean or remove dust or debris.
- .3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Moderate Risk procedures would be required if the material cannot be adequately wetted due to hazard or damage.
- .4 Wet ACM prior to work and keep ACM wet throughout the removal process.
- .5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .6 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet

sweeping or mopping.

3.4 Asbestos Removal - Vinyl Asbestos Tile

- .1 Wedge a heavy duty scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile but continue to force balance of tile up.
- .2 Place tile, without breaking into smaller pieces, into Asbestos Waste Container.
- .3 Force scraper through tightly adhered areas by striking scraper handle with a hammer.
- .4 Heat tile thoroughly with a hot air gun until heat penetrates through tile and softens adhesive in areas where scraper will not remove tile.
- .5 Scrape up adhesive remaining on floor with a hand scraper until only a thin smooth film remains.
- .6 Use a hot air gun where deposits are heavy or difficult to scrape.
- .7 Deposit scrapings into asbestos waste disposal bag.
- .8 HEPA vacuum floor on completion of work in area.

3.5 Asbestos Removal - Removal of Other Non-Friable Asbestos Materials

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.6 Abatement Work Area Dismantling

- .1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.
- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting and drop sheets toward the centre. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove remaining polyethylene sheeting and tape.
- .7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.7 Waste and Material Handling

- .1 Refer to Section 02 81 00.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Remove and dispose of the following materials as clean waste prior to asbestos removal work without disturbing asbestos-containing materials:
 - .1 Carpet, thresholds, tack strips and underpad.
 - .2 Millwork and cabinets.
 - .3 Doors and door hardware.
- .2 Using Moderate Risk procedures of this section, remove and dispose of the following:
 - .1 Asbestos-containing mechanical insulations and debris in the following locations:
 - .1
 - .2 Asbestos-containing lay-in ceiling tiles, grid, hangers in the following locations:
 - .1
 - .3 Asbestos-containing laminated ceiling tiles, grid, support system, hangers and drywall substrate in the following locations:
 - .1
 - .4 Asbestos-containing vinyl sheet flooring complete with paper underpad in the following locations:
 - .1
 - .5 Drywall with drywall joint compound containing asbestos, fasteners, strapping, hangers and studs in the following locations:
 - .1
 - .6 Asbestos-containing plaster, lath, strapping, studs, in the following locations:
 - .1

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of asbestos.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.

- .4 The measures and procedures prescribed by this section including decontamination of the worker.
- .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
 - .1 Provide workers, at a minimum, with non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
 - .2 Provide workers, at a minimum, with full face respirators with P100 high efficiency (HEPA) cartridge filters, for:
 - .1 Removal of all or part of a ceiling if asbestos is likely lying on the surface.
 - .2 Use of a HEPA filtered power tool on non-friable ACM if the material is not wetted.
 - .3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.5 Inspections

- .1 Refer to Part 1.12 Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections expectations are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance
 - .4 Milestone Inspection – Clearance Sampling
 - .5 Milestone Inspection – Dismantling Inspection

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.
- .2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.
- .3 Type C Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of polyethylene sheeting on each side of wall. Install 13 mm OSB, plywood or gypsum board over polyethylene sheeting on Occupied Area side. Paint Occupied Area side of plywood, OSB, or gypsum board with one coat of primer and one coat of flat white latex.

- .4 **Windows:** Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Clean Room

- .1 Clean Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .2 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Clean Room.
- .3 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting on floor.
- .4 Install one layer of rip-proof polyethylene sheeting over roof.
 - .1 Turn 600 mm of polyethylene down the sides over the polyethylene on the perimeter walls.
- .5 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .2 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .3 Provide power from ground fault interrupt circuits.
- .4 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

3.2 Site Preparation –Enclosure Required

- .1 Install polyethylene enclosure, complete with Windows, at Abatement Work Area:

- .2 Install Transfer Room.
- .3 Install Curtained Doorways.
- .4 Install polyethylene sheeting at openings in walls (as required) and seal.
- .5 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .6 Install polyethylene sheeting on floors of Abatement Work Area. Use enough layers to provide adequate protection for carpeting and equipment.
 - .1 Minimum requirement over carpet is one layer of 6 mil polyethylene under one layer of rip-proof polyethylene.
 - .2 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .7 Install 6 mil polyethylene sheeting on walls within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.
- .8 Provide a completely sealed polyethylene ceiling for free standing enclosures.
- .9 Extend to underside of ceiling system, enclosures for access into ceilings. Enclosure may be supported from the ceiling system if ceiling can support the polyethylene.
- .10 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .11 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide enough HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 15 minutes.
 - .2 Arrange negative air units to maximize the distance between units and decontamination facilities.
 - .3 Provide weighted flaps in perimeter Hoarding Walls as necessary to provide make-up air.
 - .4 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.
 - .5 Replace prefilters to maintain specified flow rate.
 - .6 Replace HEPA filter as required to maintain flow rate and integrity of unit.
 - .7 Discharge HEPA filtered negative air machines as follows:
 - .1 To building exterior.
 - .1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.
 - .2 Install panel securely in window frame so that it cannot be pushed into the building and make weather-tight with caulking.
 - .3 For each negative pressure unit, provide a 300 mm diameter, screened, duct opening through panel.
 - .4 Direct discharge away from building access points.

- .8 Use polyethylene discharge ducting. Use metal reinforced polyethylene discharge ducting in locations where the ducting must be protected from damage or collapse.
- .9 Install and make airtight all negative air discharge ducting running through occupied areas.
- .12 Place required tools to complete the abatement with the Abatement Work Area.
- .13 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

3.3 Site Preparation – No Enclosure Required

- .1 Cover walls, floors, finishes, millwork, equipment and furnishings remaining in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.
- .2 Install caution tape around work area where existing walls are not present.
- .3 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .4 Install temporary lighting in Abatement Work Area to a level that will provide for safe and efficient use of Work Area - minimum 550 LUX.
- .5 Place HEPA vacuum in Abatement Work Area.
- .6 Place required tools to complete the abatement with the Abatement Work Area.

3.4 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Asbestos Removal - General

- .1 Do not use compressed air to clean or remove dust or debris.
- .2 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .3 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .4 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.6 Asbestos Removal - Mechanical Insulation (less than 1 Square Foot)

- .1 Use the procedures described above under *Site Preparation –No Enclosure Required*.

- .2 Adequately wet exterior of the ACM with amended water to suppress dust.
- .3 Remove asbestos-containing mechanical insulations in layers, maintaining all exposed surfaces of insulation in a wet condition.
- .4 Remove wetted ACM directly into waste containers. Do not allow ACM to fall to the floor of the Abatement Work Area.
- .5 Hold the nozzle of a HEPA vacuum adjacent to the surface of the mechanical insulation to capture dust disturbed during the removal.
- .6 Clean all surfaces from which ACM has been removed with scouring pads, vacuuming or wet-sponging to remove all visible material after completion of removal of ACM.
- .7 Remove visible dust and debris.
- .8 Seal exposed ends of asbestos-containing mechanical insulation to remain, with canvas and lagging.
- .9 HEPA vacuum or wet clean entire Abatement Work Area, including any surfaces not covered with polyethylene sheeting. Any materials that were removed to access the ACM that are to be re-used, and any abatement equipment, must be wet cleaned or HEPA vacuumed prior to completion.
- .10 Apply Post Removal Sealant to all surfaces within the Abatement Work Area including those from which ACM has been removed.

3.7 Asbestos Removal - Texture Finish (less than 1 Square Foot)

- .1 Use the procedures described above under *Site Preparation –No Enclosure Required*.
- .2 Adequately wet exterior of the ACM with amended water to suppress dust.
- .3 Scrape wetted ACM directly into waste containers. Do not allow ACM to fall to the floor of the Abatement Work Area.
- .4 Hold the nozzle of a HEPA vacuum adjacent to the surface of the cutting surface to capture dust disturbed during the removal.
- .5 Clean all surfaces from which ACM has been removed with scrapers, scouring pads, vacuuming or wet-sponging, etc. to remove all visible material after completion of removal of ACM.
- .6 Remove visible dust and debris.
- .7 HEPA vacuum or wet clean the entire Abatement Work Area, including any surfaces not covered with polyethylene sheeting. Any materials that were removed to access the ACM that are to be re-used, and any abatement equipment, must be wet cleaned or HEPA vacuumed prior to completion.
- .8 Apply Post Removal Sealant to all surfaces within the Abatement Work Area including those from which ACM has been removed.

3.8 Asbestos Removal – Vinyl Sheet Flooring (less than 100 square feet)

- .1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.
- .2 Use only hand-help non-powered tools.
- .3 Remove binding strips or other restrictive mouldings.
- .4 Make series of cuts 100 to 200 mm apart through top layers and about halfway through

- paper backing/underpad.
- .5 Pry up a strip or vinyl sheet flooring at corner of Abatement Work Area and work to centre.
 - .6 Pull sheet back upon itself slowly and evenly along with any adhering underpad which remains attached to top layers.
 - .7 Roll up strip (finished side out) into tight roll, tape or tie securely, and place into Asbestos Waste Container.
 - .8 As vinyl sheet flooring is removed, wet all exposed ACM underpad/backing with Amended Water.
 - .9 Remove remaining adhered underpad by wet scraping as follows:
 - .1 Wet underpad with amended water applied by sprayer.
 - .2 Scrape off all remaining material including mastic.
 - .3 Place scrapings in Asbestos Waste Container.
 - .10 Allow floor to dry and clean with HEPA vacuum.
 - .11 Wet clean or HEPA vacuum Abatement Work Area, including any surfaces not covered with polyethylene sheeting. Any materials removed to access ACM that are to be re-used, and any abatement equipment, must be wet cleaned or vacuumed prior to completion.
 - .12 Apply a coat of Post Removal Sealer to all surfaces within the Abatement Work Area from which ACM has been removed.

3.9 Asbestos Removal - Ceiling tiles (less than 100 square feet)

- .1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.
- .2 Mist surface of ceiling tiles.
- .3 Remove ceiling tiles intact. Do not break or pulverize.
- .4 Place directly into asbestos waste container.
- .5 Remove visible dust and debris including at grid.
- .6 Do not damage or remove grid.
- .7 Allow floor to dry and clean with HEPA vacuum.
- .8 Wet clean or HEPA vacuum Abatement Work Area, including any surfaces not covered with polyethylene sheeting (i.e. ceiling grid). Any materials removed to access ACM that are to be re-used, and any abatement equipment, must be wet cleaned or vacuumed prior to completion.
- .9 Remove ceiling grid and support system and dispose of as clean waste where specified to be removed.
- .10 Apply a coat of Post Removal Sealer to all surfaces within the Abatement Work Area from which ACM has been removed.

3.10 Asbestos Removal - Drywall with Asbestos Drywall Joint Compound (less than 1 square foot of drywall joint compound)

- .1 Use the procedures described above under *Site Preparation –No Enclosure Required*.

- .2 Carefully cut drywall and remove using non-powered hand-held tools. Place directly into polyethylene waste bag.
- .3 Hold the nozzle of a HEPA vacuum adjacent to the surface of the cutting surface to capture dust disturbed during the removal.
- .4 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.11 Asbestos Removal - Drywall with Asbestos Drywall Joint Compound (greater than 1 square foot of drywall joint compound)

- .1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.
- .2 Protect drywall around area to be removed by covering with polyethylene and taping seams to wall.
- .3 Cut drywall and remove using non-powered hand-held tools. Place directly into polyethylene waste bag.
- .4 Remove all screws and fasteners in studs or strapping.
- .5 Remove studs and strapping where specified. Clean metal studs and remove from Abatement Work Area.
- .6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.12 Asbestos Removal - Other Non-Friable Asbestos Materials with HEPA Filtered Power Tools

- .1 Use the procedures described above under *Site Preparation –No Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Undo fasteners if necessary to remove material.
- .4 Use hand held powered tools with a HEPA filtered dust collection device to remove, cut, grind, abrade, break or vibrate ACM.
- .5 Scrape to remove any remaining material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.
- .7 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.13 Asbestos Removal - Dust and Debris

- .1 Use the procedures described above under *Site Preparation –No Enclosure Required*.
- .2 Remove visible dust and debris from Abatement Work Area using HEPA vacuums or wet cleaning methods.

3.14 Application of Post Removal Sealant

- .1 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer’s Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and

surfaces scheduled for demolition.

- .2 Do not apply post removal sealant to materials that will be damaged by its application.

3.15 Air Clearance Monitoring

- .1 Air clearance monitoring will be conducted in situations where an enclosure has been constructed around the Abatement Work Area.
- .2 Site must be dry prior to Air Clearance Monitoring.
- .3 Restrict access to Abatement Work Area and operate negative air units for an 8-hour period prior to Milestone Inspection – Clearance Sampling.
- .4 The HEPA filtered negative pressure machines shall be in operation during clearance air monitoring.
- .5 In the presence of the Abatement Consultant, immediately prior to air clearance monitoring, use a leaf blower to dislodge loose fibre.
 - .1 Direct leaf blower against walls, ceilings, floors, and other surfaces.
 - .2 Perform this for at least five minutes per 1,000 sq. ft. of Abatement Work Area.
- .6 PCM samples will be collected as per Air Monitoring Section.

3.16 Abatement Work Area Dismantling

- .1 Use Low Risk worker precautions during dismantling.
- .2 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .3 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.
- .4 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .5 Wet drop sheets and polyethylene sheeting.
- .6 Carefully roll polyethylene sheeting and drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .7 Remove remaining polyethylene sheeting and tape and dispose of as asbestos waste.
- .8 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.
- .9 Remove remaining site isolation, seals, tape, etc.
- .10 Remove Transfer Room.
- .11 Remove seals, tape, Signage etc.
- .12 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.
- .13 Seal openings in HEPA vacuums.
- .14 Remove and dispose of the pre-filters from HEPA filtered negative pressure machines as asbestos waste.

- .15 Remove HEPA filtered negative pressure machines and discharge ducting or HEPA vacuums.
- .16 Remove temporary lights.
- .17 Remove ground fault panels.
- .18 Place contaminated materials including polyethylene sheeting, drop sheets, seals, tape, disposable coveralls, and other contaminated waste in asbestos waste containers.

3.17 Waste and Material Handling

- .1 Refer to Section 02 81 00.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to the hazardous materials reports provided for the extent of the Abatement Work Areas.
- .2 Without disturbing asbestos-containing materials, remove and dispose the following materials as clean waste prior to asbestos removal work:
 - .1 Carpet, thresholds, tack strips and underpad.
 - .2 Millwork and cabinets.
 - .3 Doors and door hardware.
- .3 Using High Risk procedures of this section, remove and dispose of the following:
 - .1 Asbestos-containing mechanical insulations.
 - .2 Ceiling tiles, grid, supports and hangers.
 - .3 Drywall ceiling, channels, supports and hangers.
 - .4 Texture coat and overspray.
 - .5 Non-asbestos mechanical insulations.
 - .6 Ceilings and bulkheads, grids, support systems.
 - .7 Column enclosures.
 - .8 Flexible ducts.
 - .9 Diffusers.
 - .10 Exit signs.
 - .11 VAV and mixing boxes.
 - .12 Light fixtures, lamps and ballasts.
 - .13 All electrical services including but not limited to conduit, bx cable, junction

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
- .2 Provide the following respiratory protection to all personnel:
 - .1 Full Face Powered Air Purifying Respirators (PAPR) with P100 high efficiency (HEPA) cartridge filters
 - .2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters for dismantling of High Risk enclosures, using Low Risk Procedures.
 - .3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

- .3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Differential Pressure Monitoring

- .1 Install differential pressure monitor at a location chosen by the Abatement Consultant.
- .2 Co-operate with the Abatement Consultant in collection of pressure monitoring data.
- .3 Maintain specified differential pressure at monitoring location. Negative air pressure is to be -0.02 inches of water, relative to the area outside the enclosed area.

1.5 Inspections

- .1 Refer to Part 1.12 Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance
 - .4 Milestone Inspection – Clearance Sampling
 - .5 Milestone Inspection – Dismantling Inspection

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.
- .2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.
- .3 Type C Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of polyethylene sheeting on each side of wall. Install 13 mm OSB, plywood or gypsum board over polyethylene sheeting on Occupied Area side. Paint Occupied Area side of plywood, OSB, or gypsum board with one coat of primer and one coat of flat white latex.
- .4 Type D Hoarding Wall: 1 Hour rated partition to ULC Design W407. Floor to deck, 38 mm x 89 mm metal studs at 400 mm o/c with continuous sill and top plate, complete with mineral wool batts in cavity, covered with 16 mm Type X gypsum wall board both sides, taped and mudded joints, with acoustic sealant at top and bottom of plates, both sides. Install 2 layers of 6 mil polyethylene sheeting on Abatement Work Area side. Paint Occupied Area side of board with one coat of primer and one coat of flat white latex.
- .5 Type E Hoarding Wall: Construct as per Type C using exterior grade plywood and insulate wall cavity with R 12 fibreglass batts insulation.
- .6 Type F Hoarding Wall: Upper perimeter hoarding wall - 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with 2 layers of polyethylene sheeting on Abatement Work Area side. Anchor wall to underside of

structure and extend down to top of ceiling or top of wall/hoarding wall below. Install wall under contaminated conditions.

- .7 Windows: Install enough transparent windows in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Decontamination Facilities

- .1 Workers' Decontamination Facility: A decontamination facility comprised of three linked rooms, Contaminated Change Room, a Shower Room, and a Clean Change Room.

.1 Rooms, Occupied Areas and Abatement Work Areas, shall be separated by curtained doorways at each door.

- .2 Contaminated Change Room: Room between the Shower Room and Abatement Work Area.

- .1 Locate on the contaminated side of Shower Room.
.2 Install an asbestos waste container for asbestos-contaminated protective clothing.
.3 Install storage facilities for any personal protective equipment to be reused in Abatement Work Area including boots, hard hats, etc., but excluding respirators.
.4 Install hooks and shelves as required for personal protective equipment.
.5 Minimum size of generally 2 m x 2 m. Increase size accordingly to accommodate number of workers.

- .3 Shower Room: Room between Clean Change Room and Contaminated Change Room.

- .1 Install one walk through shower unit for every six workers.
.2 Install constant supply of hot and cold water, controllable at each shower. Water supply must be sufficient to provide water at a minimum temperature of 40 degrees Celsius (maximum 50 degrees) in a volume required for all workers to properly decontaminate.
.1 Install individual hot and cold shut-off valves on water supply located on clean side of Shower Room. Connect shower to these valves.
.2 Install individual controls inside the shower to regulate water flow and temperature.
.3 Install rigid piping or Shower Hose with watertight connections for supply and drains.
.4 Install a sealed drip pan under and around the showers, 150 mm deep.
.5 Install sump pumps, sufficient for volume of waste shower water from showers and drip pan. Direct waste shower water to sanitary drains. Water must pass through a 10 micrometer filter before it is directed to the sanitary drain.
.6 Install ground fault protected power switch on clean side of shower for sump pump shut off.
.7 Provide adequate quantity of soap, shampoo, and clean towels.
.8 Install an Asbestos Waste Container for disposal of used respirator filters, on the contaminated side of the Shower Room.

- .4 Clean Change Room: A room between the Shower Room and Occupied Areas.

- .1 Install hooks and shelves on clean side of shower in clean Change Room for storage of respirators.
.2 Install lockers or hangers for workers' street clothes and personal belongings.

- .3 Install a hose bib on domestic cold water piping to provide a connection on the clean side of Abatement Work Area.
 - .4 Install electric hot water tank for showers in decontamination facility.
 - .5 Provide ground fault protected power supply to hot water tanks, sump pump, battery chargers.
 - .6 Install a fire extinguisher, mount to wall.
 - .7 Minimum size of generally 2m x 2m. Increase size accordingly to accommodate number of workers.
- .5 Waste and Equipment Decontamination Facility: Waste and Equipment Decontamination Facility comprised of three linked rooms: a Container Cleaning Room, a Holding Room and a Transfer Room.
- .1 Purpose of Waste and Equipment Decontamination Facility is to provide a means to decontaminate asbestos waste containers, scaffolding, vacuums, and other tools and equipment and materials required in the Abatement Work Area.
 - .2 Rooms, Occupied Areas and Abatement Work Areas, shall be separated by curtained doorways at each door.
- .6 Container Cleaning Room: Room between Abatement Work Area and Holding Room of sufficient size to allow proper washing of equipment and waste containers or double bagging of asbestos waste. All wash water shall be treated as asbestos contaminated waste.
- .7 Holding Room: Room between Container Cleaning Room and Transfer Room, of sufficient size to accommodate at least two asbestos waste containers and two workers double bagging waste, or for largest item of equipment used.
- .1 Install a fire extinguisher mounted to wall.
- .8 Transfer Room: Room between Holding Room and Occupied Area, acting as an air lock for the transfer of waste.
- .9 Construction of Decontamination Facilities
- .1 Install floor protection as follows:
 - .1 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire decontamination facility.
 - .2 Turn 600 mm of polyethylene up the sides of the decontamination facility and overlap with the polyethylene sheeting covering the walls.
 - .3 Install plywood with taped and caulked joints between layers of 6 mil polyethylene where required to protect surfaces from water damage (e.g. carpet).
 - .2 Install walls as follows:
 - .1 Around all rooms, between all rooms, at entrance to Abatement Work Area and at entrance to Occupied Area.
 - .2 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .3 Install one layer rip-proof polyethylene sheeting on interior walls of Decontamination Facility.
 - .4 Install one layer rip-proof polyethylene sheeting both sides on interior dividing walls of Decontamination Facility.

- .5 Install one layer rip-proof polyethylene sheeting over one layer of 6 mil polyethylene sheeting on walls exposed to the Abatement Work Area.
- .6 For perimeter walls exposed to the Abatement Work Area, install 13 mm plywood or OSB caulked and sealed at joints, beneath one layer of 6 mil and one layer of rip-proof polyethylene sheeting, on Abatement Work Area side of framing.
- .7 Install one layer rip-proof polyethylene sheeting over one layer of 6 mil polyethylene sheeting on walls exposed to the Occupied Area.
- .8 For perimeter walls exposed to the Occupied Area, install 13 mm plywood or OSB caulked and sealed at joints, over polyethylene sheeting, on Occupied Area side of framing. Paint with 2 coats white latex.
- .3 Install roof as follows:
 - .1 Install joists. Size of joists is to be determined by clear span. Consult Provincial Building Code. For clear spans up to 2850 mm use SPF Select 38 x 140 mm wood joist at 400 mm o/c with continuous 38 x 140 mm wood headers and install strapping beneath joists.
 - .2 At the Contaminated Change Room and where roof is exposed to the Abatement Work Area, install 19 mm plywood or OSB over joists. Caulk and tape joints and install one layer rip-proof polyethylene sheeting over 2 layers of 6 mil polyethylene sheeting.
 - .3 Where roof is not exposed to the Abatement Work Area, install one layer rip-proof polyethylene sheeting over joists.
 - .4 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.
 - .5 At underside of joists in all rooms, install one layer of polyethylene sheeting.
 - .6 Minimum interior clear height 2000 mm to underside of joist.
- .10 Curtained Doorways
 - .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors between chambers, facilities and Abatement Work Area.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Clean Site Preparation

- .1 Remove stored or non-fixed items from the Abatement Work Area, including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping using Moderate Risk Procedures.
- .4 Remove surface-mounted fixtures specified to be reused or turned over to Owner.
- .5 Install platforms in areas specified.
- .6 Install tunnels in areas specified.
- .7 Install Hoarding Walls between Abatement Work Area and Occupied Area.
- .8 Install Worker Decontamination facility.
 - .1 Worker Decontamination Facility to be located within the Abatement Work Area.
- .9 Install Waste Decontamination facility.
 - .1 Waste Decontamination Facility to be located within the Abatement Work Area.
- .10 Seal openings (excepting electrical trenches) in floor using tape, caulking, polyethylene, etc. Openings in floor are to be sealed independently prior to installation of polyethylene sheeting on floor. Include floors of duct and service shafts.
 - .1 Large openings in floor to be covered. Construction to comply with loading requirements of Provincial Building Code and secured in place. Surround with guard rails as per the Provincial Occupational Health and Safety Code. Install one layer of rip proof polyethylene over two layers of 6 mil polyethylene over the cover. Mark as an opening to below. No personnel are to walk or stand on the covered opening unless constructed to support live and dead load.
- .11 Seal openings in walls below ceiling level using polyethylene, tape, caulking, etc. including but not limited to windows, doors, vents, diffusers, etc.
- .12 Seal openings in ceiling, using polyethylene, tape, caulking, etc. including diffusers, grills, etc.
- .13 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Discharge HEPA filtered negative pressure machines as follows:
 - .1 To building exterior.
 - .1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.
 - .2 Install panel securely on the exterior side of the window frame and make weather-tight with caulking.
 - .3 For each negative pressure unit, provide a 300 mm diameter, duct opening through panel.
 - .4 Cover duct opening with chicken wire.
 - .5 Direct discharge away from building access points.
 - .6 Reinstall glazing to match existing upon completion of work.
- .14 Install Ground Fault Panel.
- .15 Install temporary lighting in all work areas at levels that will provide for a safe and efficient use of the work area.
- .16 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

- .1 Lock-out/tag-out power at electrical panels.
- .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .17 Install hose bib on domestic cold water pipe for connection of hoses for wetting.
 - .1 Install hoses with watertight connections and airless sprayers to wet asbestos-containing materials.
- .18 Perform clean demolition of non-asbestos materials as specified.
- .19 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting, on floor surfaces in Abatement Work Area.
 - .1 Install additional layers of rip-proof polyethylene and/or plywood to protect carpeted floor surfaces.
 - .2 Extend floor protection a minimum of 300 mm up all vertical surfaces in the Abatement Work Area.
- .20 On walls within, and forming the perimeter of the Abatement Work Area, install two layers of 6 mil polyethylene sheeting.
 - .1 At the junction of floor and wall surfaces, overlap floor polyethylene with wall polyethylene by a minimum of 300 mm at each layer. One layer of wall polyethylene must always overlap the top layer of floor polyethylene.
- .21 Notify Abatement Consultant to the need for Milestone Inspection - Clean Site Preparation. Obtain written approval for this Milestone Inspection before proceeding.
- .22 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .23 Post provincial Asbestos Project Notification documentation.

3.2 Maintenance of Contaminated Abatement Work Area

- .1 Inspect Abatement Work Area perimeter Hoarding Walls and Upper Perimeter Seals at the beginning and end of each working period and once on each day where work does not take place. Inspection must be performed by competent person.
- .2 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .3 Perform Differential Pressure Monitoring on a frequent basis and record pressure at start and end of shift at a minimum.
- .4 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .5 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .6 Maintain Abatement Work Area in tidy condition.
- .7 Remove waste and debris frequently.
- .8 Remove standing water on polyethylene/floor at the end of every shift.
- .9 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

- .10 Turn off water supply to showers, at the end of every shift.
- .11 Ensure shower pans are pumped out at the end of every use and shift.

3.3 Wet Removal

- .1 Do not use compressed air to clean or remove dust or debris.
- .2 Remove and dispose of remaining non-asbestos items before, during or after wet removal.
- .3 Spray asbestos-containing sprayed or trowelled material with Amended Water using airless spray equipment prior to removal. Saturate ACM to prevent release of airborne fibres during removal.
- .4 Remove asbestos-containing sprayed or trowelled material specified to be removed, clean substrate.
 - .1 Fully saturated ACM may be scraped directly into waste containers or may be allowed to fall to floor.
 - .2 ACM cannot be allowed to fall from one level to the next.
- .5 Spray asbestos-containing pipe insulations with Amended Water using airless spray equipment.
- .6 Remove pipe insulations specified to be removed and clean substrate. Maintain exposed surfaces of insulation or lagging in a wet condition.
 - .1 Full saturation of insulation will not be required if material is immediately bagged and not allowed to fall to floor.
 - .2 ACM cannot be allowed to fall from one level to the next.
- .7 Spray asbestos-containing duct and mechanical equipment insulations with Amended Water using airless spray equipment.
- .8 Remove exterior duct and mechanical equipment insulations specified to be removed and clean substrate. Maintain exposed surfaces of insulation in a wet condition.
 - .1 Full saturation of insulation will not be required if material is immediately bagged and not allowed to fall to floor.
 - .2 ACM cannot be allowed to fall from one level to the next.
- .9 Remove obstructions as required to remove the ACM.
 - .1 Notify Abatement Consultant if item is not specified to be removed and inhibits removal of ACM.
 - .2 Do not demolish any existing walls etc. that form the perimeter of the Abatement Work Area without prior written permission from Abatement Consultant.
- .10 All dislodged ACM shall be maintained in wet state until placed in asbestos waste containers for disposal.
- .11 As work progresses, and at regular intervals, place waste in asbestos waste containers and remove from the Abatement Work Area.
- .12 After completion of gross asbestos removal work, perform the following:
 - .1 Wet clean surfaces from which ACM has been removed with stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials.

- .2 Wet clean surfaces which ACM has fallen on using stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials
 - .3 Wet clean other surfaces in the Abatement Work Area, including the decontamination facilities, scaffolding, equipment, polyethylene sheeting on floor and walls surfaces etc., ducts and similar items not covered with polyethylene sheeting.
 - .4 Remove wash water as contaminated waste.
 - .5 Remove waste.
 - .6 Level of cleanliness must be acceptable to Abatement Consultant.
 - .7 Remove and dispose of the pre-filters from all negative air units as asbestos-contaminated waste.
- .13 Notify Abatement Consultant to the need for Milestone Inspection - Visual Clearance.

3.4 Waste and Material Handling

- .1 Waste bins must be placed on grade or in receiving.
- .2 All bins must be covered and locked when waste transfer is not being performed.
- .3 Ensure redundant non-ACM, rubble, debris, etc. which was not cleaned and which was removed during contaminated work are treated, packaged, transported and disposed of as asbestos waste.
- .4 Fluorescent lamps contain mercury and are to be recycled. Do not dispose of fluorescent lamps.
- .5 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Abatement Work Area.
 - .1 Recycle metals or dispose of metals as clean waste.
- .6 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste.
 - .1 Obtain prior written approval from the Abatement Consultant for each individual type of material.
- .7 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.
- .8 Place all equipment, tools and unused materials that cannot be cleaned in Asbestos Waste Containers.
- .9 As work progresses, and at regular intervals, transport the sealed and labelled asbestos waste containers from the Abatement Work Area to waste bin.
- .10 Place items in bins according to waste classification. Place asbestos waste, metals, non-asbestos waste, etc. in separate bins.
- .11 Removal of waste containers and decontaminated equipment and materials from the Abatement Work Area shall be performed using the Waste and Equipment Decontamination Facility as follows:
 - .1 Prior to entering the Waste and Equipment Decontamination Facility Container Cleaning Room, the first worker (fully protected inside the Abatement Work Area) shall remove any visible contamination from the surface of the item or waste container being removed from the Abatement Work Area.

- .2 The first worker then carries the item into the Container Cleaning Room and wet sponges the item prior to passing the item through the curtained doorway to a second worker in the Holding Room. (The second worker shall be fully protected with respirator and disposable clothing and may only leave the decontamination facility via the Abatement Work Area.)
- .3 The second worker in the Holding Room double bags or wraps and seals the item. Without entering the Transfer Room, the second worker passes the item through the curtained doorway into the Transfer Room.
- .4 A third worker enters the Transfer Room from the clean area. (The third worker must never enter the Holding Room.) The third worker removes the item from the Transfer Room and transports it to the disposal bin.
- .12 Dispose of plaster debris, lath, hangers and other asbestos-contaminated waste that could tear a 6 mil (0.15 mm) polyethylene bag in sealed rigid Asbestos Waste Container.
- .13 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .14 Use Low Risk Procedures while transporting waste through facility.
- .15 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.
- .16 Bin loading area and waste routes shall be kept clean at all times. Use Moderate Risk asbestos abatement procedures if appropriate or requested by Owner's Representative.
- .17 Transport asbestos contaminated waste in accordance with the requirements of Alberta Environment.

3.5 Application Of Post Removal Sealant

- .1 Wet Removal
 - .1 Obtain Abatement Consultant's written permission to proceed.
 - .2 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.
 - .1 Do not apply post removal sealant to materials that will be damaged by its application.
 - .3 Notify Abatement Consultant to the need for Milestone Inspection – Clearance Sampling.

3.6 Air Clearance Monitoring

- .1 Site must be dry prior to Air Clearance Monitoring.
- .2 The minimum number of Air Clearance Monitoring samples will be as follows:
 - .1 1 sample for less than 100 square metres.
 - .2 2 samples for 100 to 500 square metres.
 - .3 3 samples for more than 500 square metres.
- .3 Prior to air clearance monitoring, install clean 20-inch fans for air circulation during Air Clearance Monitoring.

- .1 At least one fan per 10,000 cubic feet of space in Abatement Work Area.
- .2 Install in centre of Abatement Work Area and space evenly.
- .3 The fan exhaust shall be directed upwards or toward the ceiling.
- .4 The fans shall be operated on the lowest speed setting.
- .4 Restrict access to Abatement Work Area and operate negative air units for an 8 hour period prior to Milestone Inspection – Clearance Sampling.
- .5 The HEPA filtered negative pressure machines shall be in operation during clearance air monitoring.
- .6 In the presence of the Abatement Consultant, immediately prior to air clearance monitoring, use a leaf blower to dislodge loose fibre.
 - .1 Direct leaf blower against walls, ceilings, floors, and other surfaces.
 - .2 Perform this for at least five minutes per 1,000 sq. ft. of Abatement Work Area.
- .7 PCM samples will be collected as per Air Monitoring Section.

3.7 Abatement Work Area Dismantling

- .1 Use Low Risk worker precautions during dismantling.
- .2 Polyethylene, tape, cleaning material, etc. to be treated as asbestos waste.
- .3 Wash remaining equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .4 Clean Abatement Work Area, Equipment and Access area, Washing/Showering Room.
- .5 Remove upper seals, and seals over tops of walls, on deck, at columns, etc. within the Abatement Work Area.
- .6 Remove top layer of polyethylene sheeting from surfaces protected by two or more layers of polyethylene sheeting. The bottom layer of polyethylene will remain until all re-fireproofing is complete. Remove outer layer as follows:
 - .1 Remove asbestos contaminated Polyethylene by carefully rolling away from walls to centre of Abatement Work Area.
 - .2 Cut the lower layer of polyethylene sheeting to expose the baseboards, window sills, cabinets, shelves and other horizontal surfaces that may be contaminated by fallen ACM.
 - .3 Remove visible fibres or residue found during removal of polyethylene using a HEPA vacuum.
 - .4 Remove polyethylene protection and hoarding walls where hoarding walls separate occupied areas from work area. Hoarding walls to remain are identified on asbestos demolition drawings.
- .7 Remove top layer of polyethylene on walls, finishes, and equipment.
- .8 Remove remaining polyethylene sheeting.
- .9 Remove water hoses and shut off at source.
- .10 Remove Signs, Hoarding Walls, Decontamination Facilities, Equipment Enclosures, Tunnels, Platforms.

- .11 Seal vacuum hoses and fittings, flexible ductwork and all tools used in contaminated work site in 6 mil polyethylene bags prior to removal from Work Area.
- .12 Remove temporary lights.
- .13 Remove negative air unit prefilters. Dispose of as asbestos contaminated waste.
- .14 Remove HEPA filtered negative pressure machines and discharge ducting.
- .15 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.
- .16 Notify Abatement Consultant to the need for Milestone Inspection - Dismantling Inspection.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to the provided hazardous materials reports for the extent of the Abatement Work Areas.
- .2 Remove and dispose of the following materials as clean waste prior to abatement work without disturbing lead-containing materials:
 - .1 Carpet, thresholds, tack strips and underpad.
 - .2 Millwork and cabinets.
 - .3 Doors and door hardware.
- .3 Comply with requirements of this Section when performing following Work (Low Risk):
 - .1 Operating construction equipment (i.e., excavator, bulldozer; within the cab) during building demolition or renovation where lead-containing paints are present.
 - .2 Installation or removal of batteries, lead sheeting, flashings, packing, babbits, caulking, gaskets or similar.
 - .3 Installation or removal of bolts covered in lead-based paint.
 - .4 Application of lead-containing paint with a brush, roller or sponge.
- .4 Comply with requirements of this Section when performing the following Work (Low-Moderate Risk):
 - .1 Removal of materials coating with lead-containing paints, using non-powered hand tools, where the materials remains primarily intact, and is not crumbled, pulverized or powdered.
 - .2 Removal of lead materials using power tools with a dust collection system and HEPA filters.
- .5 Comply with requirements of this Section when performing the following Work (Moderate Risk):
 - .1 Removal of lead-containing paint by hand with a chemical gel, stripper or paste.
 - .2 Removal of lead-containing paints by hand with a heat gun.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during

abatement work, including:

- .1 Limitations of equipment.
- .2 Inspection and maintenance of equipment.
- .3 Proper fitting of equipment.
- .4 Disinfecting and cleaning of equipment.
- .3 Personal hygiene to be observed when performing the work.
- .4 The measures and procedures prescribed by this section including decontamination of the worker.
- .2 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of lead exists.
 - .1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
 - .2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .2 Dust impermeable gloves appropriate for the work being completed.
 - .2 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
 - .3 Lead-specific soaps and hygiene indicators are recommended to be provided for hand-wash stations.

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .1 Install one layer of polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Abatement Work Area.
- .2 Install polyethylene drop sheets below areas of work.
- .3 Install polyethylene sheeting on openings in walls and floors (as required) and seal.
- .4 Install barriers and signage in clearly visible locations and in sufficient number to adequately warn of a lead dust hazard.

- .5 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .6 Remove visible dust from all surfaces in the Abatement Work Area including those to be worked on, using HEPA Vacuums or wet wiping.
- .7 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .8 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.
 - .1 Ensure safe installation of electrical lines and equipment.

3.2 Maintenance of Abatement Work Area

- .1 Maintain Abatement Work Area in tidy condition.
- .2 Remove waste and debris frequently.
- .3 Remove standing water on polyethylene/floor at the end of every shift.
- .4 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Lead-Containing Paint Abatement

- .1 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .2 Wetting agents should be used where possible.
 - .3 Wet method not be used if it creates a hazard or cause damage to equipment or to building finishes.
- .2 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .3 Remove lead-based paint in small sections and pack as it is being removed in sealable lead waste containers.
- .4 Follow manufacturer's instructions for all use of chemical gels, strippers and pastes.
 - .1 Ensure agent neutralizers, were required, are applied.
- .5 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .6 After wire brushing and wet sponging to remove visible lead-based paint, wet clean entire Work Area, and equipment used in process.
 - .1 Compressed air or dry sweeping must not be used to clean up lead-containing dust or waste.

- .2 Ensure all waste is cleaned and packaged.
- .7 Frequently and at regular intervals, place all waste in waste containers.
- .8 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside.

3.4 Bulk Lead Removal

- .1 Remove and recycle lead-containing batteries.
- .2 Remove cast-iron pipes with bell and spigot joints intact. Metal pipes should be recycled.

3.5 Waste Management and Disposal

- .1 Per Section 02 81 00.

3.6 Final Cleaning

- .1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .2 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .3 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to the provided hazardous materials reports for the extent of the Abatement Work Areas.
- .2 Remove and dispose of the following materials as clean waste prior to abatement work without disturbing lead-containing materials:
 - .1 Carpet, thresholds, tack strips and underpad.
 - .2 Millwork and cabinets.
 - .3 Doors and door hardware.
- .3 Comply with requirements of this Section when performing the following Work (Moderate Risk):
 - .1 Removal of lead-containing paint with a chemical gel, stripper or paste.
 - .2 Removal of lead-containing paints with a heat gun.
 - .3 Removal of lead-containing paint with laser ablation technology.
 - .4 Scraping or sanding lead-containing coatings using non-powered hand tools where significant disturbance will take place.
 - .5 Manually demolishing lead-painted plaster walls or building components using a sledgehammer or similar tool.
 - .6 Cleaning up and removing lead-containing dust and debris.
- .4 Comply with requirements of this Section when performing the following Work (Moderate-High Risk):
 - .1 Using a powered cutting device for dry removal of mortar that contains lead.
 - .2 Removing lead-containing coatings using a power tool without a HEPA filtered dust collection system.
 - .3 Demolishing or cleaning up facilities where lead-containing products were manufactured.
 - .4 Removal of lead-containing paints using high pressure water jet.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.

- .3 Proper fitting of equipment.
- .4 Disinfecting and cleaning of equipment.
- .3 Personal hygiene to be observed when performing the work.
- .4 The measures and procedures prescribed by this section including decontamination of the worker.
- .2 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of lead exists.
 - .1 Provide the following respiratory protection to all personnel, at minimum:
 - .1 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
 - .2 Non-powered full-face respirators with P100 high efficiency (HEPA) cartridge filters.
 - .3 Powered full-face respirators with P100 high efficiency (HEPA) cartridge filters.
 - .2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Dust impermeable gloves appropriate for the work being completed.
 - .2 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .2 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
 - .3 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.
- .2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.
- .3 Type C Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of polyethylene sheeting on each side of wall. Install 13 mm OSB, plywood or gypsum board over polyethylene sheeting on Occupied Area side. Paint Occupied Area side of plywood, OSB, or gypsum board with one coat of primer and one coat of flat white latex.
- .4 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Clean Room

- .1 Clean Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .2 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Clean Room.
- .3 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting on floor.
- .4 Install one layer of rip-proof polyethylene sheeting over roof.
- .5 Turn 600 mm of polyethylene down the sides over the polyethylene on the perimeter walls.
- .6 Install a fire extinguisher, mount to wall.

2.4 Shower Room

- .1 Install constant supply of hot and cold water, controllable at each shower. Water supply must be sufficient to provide water at a minimum temperature of 40 degrees Celsius (maximum 50 degrees) in a volume required for all workers to properly decontaminate.
 - .1 Install individual hot and cold shut-off valves on water supply located on clean side of Shower Room. Connect shower to these valves.
 - .2 Install individual controls inside the shower to regulate water flow and temperature.
- .2 Install rigid piping or Shower Hose with watertight connections for supply and drains.
- .3 Install a sealed drip pan under and around the showers, 150 mm deep.
- .4 Install sump pumps, sufficient for volume of waste shower water from showers and drip pan. Direct waste shower water to sanitary drains.
- .5 Install ground fault protected power switch on clean side of shower for sump pumps shut off.
- .6 Provide adequate quantity of soap, shampoo, and clean towels.

2.5 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Clean Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste, etc., shall be removed from the Abatement Work Area prior to abatement work.
- .3 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .4 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .5 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.
 - .1 Ensure safe installation of electrical lines and equipment.

3.2 Site Preparation –Enclosure

- .1 Install Curtained Doorways.
- .2 Install polyethylene sheeting at openings in walls (as required) and seal.
- .3 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .4 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.
 - .1 Minimum requirement over carpet is one layer of 6 mil polyethylene under one layer of rip-proof polyethylene.
 - .2 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .5 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.
- .6 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.
- .7 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .8 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 15 minutes.

- .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
- .3 Operate HEPA filtered negative pressure machines continuously from first disturbance of lead-containing materials until completion of dismantling.
- .4 Replace prefilters to maintain specified flow rate.
- .5 Replace HEPA filter as required to maintain flow rate and integrity of unit.
- .6 Discharge HEPA filtered negative air machines to building exterior, where possible. Direct discharge away from building access points.
- .9 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of lead hazard, and lead hazard where appropriate.

3.3 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.4 Lead-Containing Paint Abatement

- .1 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .1 Wetting agents should be used where possible.
 - .2 Wet method not be used if it creates a hazard or cause damage to equipment or to building finishes.
- .2 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.
- .3 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .4 Remove lead-based paint in small sections and pack as it is being removed in sealable waste containers.
- .5 Waste generated should be maintained wet until cleaned and packaged.
- .6 Follow manufacturer's instructions for all use of chemical gels, strippers and pastes.
 - .1 Ensure agent neutralizers, were required, are applied.

- .7 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .8 After wire brushing and wet sponging to remove visible lead based paint, wet clean entire work area, and equipment used in process.
 - .1 Compressed air or dry sweeping must not be used to clean up lead-containing dust or waste.
 - .2 Ensure all waste is cleaned and packaged.
- .9 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

3.5 Waste Management and Disposal

- .1 Per Section 02 81 00.

3.6 Final Cleaning

- .1 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and seal. Dispose of in accordance with waste materials generated.
- .2 Clean Work areas, Clean Room, and Transfer Room, where present.
- .3 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.
- .4 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and destruction of:
 - .1 PCB-containing ballasts
- .2 All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

1.3 Quality Assurance

- .1 Ensure the removal and handling of PCBs is performed by persons experienced in the relevant methods, procedures and industry practices.
- .2 Complete work so that at no time do PCBs contaminate the building or environment.

1.4 Instruction and Training

- .1 Instruction and training must be provided to all workers and supervisors. Instruction and training includes the following:
 - .1 Hazards of PCBs.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section.
- .2 Instruction and training must be provided by a competent, qualified person.

1.5 Personal Protection

- .1 Workers handling PCB-containing materials are advised to avoid skin and eye contact.
- .2 During removal of PCBs, personnel are to wear personal protective equipment appropriate to the task.
- .3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.6 Inspections

- .1 Refer to Part 1.12 Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS

2.1 Materials

- .1 Containment Drums: new, not used double bung 45 gallon No. 16 gauge cold rolled steel drums with removable steel lid, PCB resistant gasket (nitrile rubber, cork or Teflon), and 12 gauge compression type ring closure with 5/8" bolt and forged lug. Drums shall be newly painted inside and out with bright white rust-resistant enamel. Metal pail of 16 gauge steel with removal steel lid, are also acceptable for smaller quantities of waste.
- .2 Decontamination Area: An established area for the purpose of decontaminating personnel and equipment.
 - .1 Of sufficient size to accommodate cleaning of equipment and removing personal protective equipment.
 - .2 Install PCB warning signs / tape at the entrance to the decontamination area.
 - .3 The floor shall be covered with polyethylene sheeting.
 - .4 Include a hand washing station complete with soap and towels and 6 mil polyethylene bags for disposal of PCB-contaminated items such as gloves, Tyvek suits, rags etc.
 - .5 All personnel must enter and exit the Abatement Work Area through the decontamination area.
 - .6 All equipment and surfaces of waste containers must be cleaned prior to removing them from the decontamination room or area.
 - .7 Work clothing must be cleaned with a HEPA vacuum before it is removed.
- .3 Drum liners: clear polyethylene bag, 36" x 60", 6 mil thick. Open one 36" end.

- .4 Label: appropriate PCB Labels and Placards of sufficient size to be clearly legible, for display on waste containers (bags, boxes, rolloffs or drums) which will be used to contain or transport PCB contaminated material, in accordance with TDG regulations.
- .5 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints. New materials only.

PART 3 EXECUTION

3.1 General

- .1 Do not contaminate building surfaces with PCBs.
- .2 Should visible PCB debris be observed outside the Work Area, immediately stop Work, notify the Consultant and Owner and institute emergency procedures as directed. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the contractor, at no additional cost to the Owner.
- .3 Notify Owner's Representative of any spills immediately.
 - .1 Any spills of PCBs are to be cleaned to the satisfaction of the Owner's Representative at the contractor's cost. This includes removal and replacement of building materials as required.
- .4 Conduct PCB removal operations in a manner that fully protects Contractor's and Subcontractor's employees, the general public, other building occupants and the environment from exposure to PCB.
- .5 Non-PCB items remaining such as windows, doors, masonry, and all other building construction and components from which PCB materials are removed shall be decontaminated by physical or chemical means such that no visible residue remains. The removal of the PCB materials may require the use of scrapers, solvents, mastic removal chemicals, or other methods/procedures to ensure complete removal.

3.2 Removal of Ballasts

- .1 Contractor is responsible for determining the actual quantity of ballasts to be disposed as PCB waste.
- .2 Prior to removing any fixtures, ensure electrical service is isolated at panel, and disconnect existing power supply to electrical equipment.
 - .1 Lock-out/tag-out power at electrical panels.
- .3 Remove the following:
 - .1 Lenses at light fixtures.
 - .2 Mercury vapour lamps (refer to Section 02 87 00).
 - .3 Light fixtures.
 - .4 Ballasts.
- .4 Install polyethylene drop sheets in packaging area to protect surfaces and finishes.

- .5 Avoid rough handling of PCB ballasts. Do not drop or throw.
- .6 Identify ballasts as either non-PCB or PCB containing.
 - .1 All ballasts not clearly labelled as “NO PCB” are to be treated as PCB containing.
 - .2 Non-PCB ballasts to be recycled or disposed as solid non-hazardous waste.
- .7 Place PCB waste on polyethylene drop sheets immediately after removal.
- .8 Package PCB-containing ballasts in Containment Drums, or on wood skids.
 - .1 Place ballasts on end in Containment Drum. When full:
 - .1 Seal liner bag with duct tape.
 - .2 Seal drum with lid, gasket and compression ring.
 - .3 Affix specified and completed label.
 - .4 Do not leave liner bags or drums open overnight.
 - .2 Shrink wrap ballasts and wood skid to prevent movement during transport.
- .9 Transport packaged PCB waste to a Ministry of the Environment and Parks approved incineration facility and destroy.

3.3 Work Area Preparation - Exterior Removal:

- .1 Take appropriate precautions (e.g. install windscreens) to prevent dust and debris from migrating due to windy conditions.
- .2 All work platforms and ground surfaces exterior to the work area shall have a layer of 6 mil fire retardant plastic sheeting, attached to the building face and laid down on the surface below the exterior abatement work area, at least 10 feet wide or to the furthest point of gravity fall for dislodged debris by methods used, whichever is further.
- .3 For work at the second storey and above, extend 6 mil fire retardant plastic sheeting as necessary.
- .4 For work above third storey, by sidewalk, street, or property boundary, scaffolding sides shall be covered in 6-mil fire retardant plastic sheeting.
- .5 All operable windows within the work area and 25 ft from all sides of the work area shall be closed.

3.4 Work Area Preparation - Interior Removal:

- .1 All floor areas adjacent to the work area shall have a layer of polyethylene sheeting, attached to the interior wall and laid down on the surfaces below the abatement work area, at least 5 feet wide or to the furthest point of gravity fall for dislodged debris by methods used, whichever is further.
- .2 All movable objects shall be removed from the immediate work area. All non-movable objects shall be covered with one layer of polyethylene sheeting and sealed at the edges.

- .3 All operable windows within the work area shall be closed.
- .4 Temporary dust barriers consisting of a minimum of polyethylene sheeting shall be installed at hallways, corridors, doorways, and other openings to the work area not used for passage during removals to establish work area containment enclosure.
- .5 Polyethylene sheeting overlapping curtained doorway shall be installed at the entrance to the work area.

3.5 Equipment and Area Decontamination

- .1 When removal of PCB materials is completed, the decontamination process shall consist of HEPA vacuuming, wet wiping/mopping and a repeated HEPA vacuuming of the entire work area. All surfaces in and around the work area must be free of dust generated during the work.
- .2 Decontaminate all tools and equipment before removal from the work area.
- .3 If dust or debris has migrated to areas of the building other than the immediate work area, those areas shall be incorporated into the work area and thoroughly decontaminated to ensure all visible dust generated by the activity is eliminated.
- .4 Uncontaminated dust barriers and other protective sheeting shall be placed in disposable construction bags and disposed of as normal trash.
- .5 Visually inspect the area for any remaining dust or debris. HEPA vacuum and wet wipe until space is clean. Dispose of vacuum contents as PCB waste.
- .6 Upon completion of decontamination and removing temporary dust barriers, a final inspection shall be performed by the Contractor.
- .7 Failure of any visual inspection by the Consultant, the Contractor will clean the affected areas at no additional expense to the Owner.

3.6 Transportation and Reporting

- .1 All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.).
 - .1 While on-site, the container shall be labelled with PCB Warning Labels and as required by Federal and Provincial regulations.
- .2 All waste generated as part of the PCB project shall be removed from the site within ten (10) calendar days after successful completion of all PCB abatement work.
- .3 The Hauler, with the Abatement Contractor, shall inspect the transport container prior to the Hauler taking possession and signing the Hazardous Waste Manifests.
- .4 A Hazardous Waste Manifest shall be utilized solely as the waste Manifest for transportation. A hauler billing form or bill of lading may be used if the hauler needs an independent record but shall not be used as a shipping document.

- .1 The Manifest shall be completed by the Contractor and verified by the Consultant that all the information and amounts are accurate, and the proper signatures are in place.
- .2 The Manifest shall have the appropriate signatures of the Owner's Representative (the Generator) and the Hauler representative prior to any waste being removed from the site.
- .3 Upon arrival at the Disposal Site, the Manifest shall be signed by the Disposal Facility operator to certify receipt of PCB materials covered by the manifest.
- .4 The Disposal Facility operator shall return the original Manifest to the Owner's Representative (the Generator).
- .5 Provide a copy of the completed waste manifest proving receipt of the PCB waste by the Disposal Facility.
- .5 Transport materials following Transportation of Dangerous Goods Act.
 - .1 Transport PCBs to approved incineration site for destruction and ensure materials are destroyed.
- .6 The facility used to process the PCBs shall be approved by the Ministry of the Environment and Parks.
 - .1 The facility must issue a Certificate of Destruction identifying types and quantities of PCBs generated from the project.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the identification, removal, preparation for disposal, transportation, and disposal of mercury-containing fluorescent and mercury vapour lamps, HVAC control systems, manometers, switches and thermostats.

1.3 Quality Assurance

- .1 Use qualified contractors to isolate mechanical/electrical services prior to the removal of lamps or other mercury-containing equipment.
- .2 Ensure the removal and handling of mercury-containing equipment is performed by persons experienced in the relevant methods, procedures and industry practices.
- .3 Complete work so that at no time does mercury contaminate the building or environment.

1.4 Instruction and Training

- .1 Instruction and training must be provided to all workers and supervisors. Instruction and training includes the following:
 - .1 Hazards of mercury.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that may be used during work, including training on:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section.
- .2 Instruction and training must be provided by a competent, qualified person.

1.5 Personal Protection

- .1 During removal of equipment containing mercury, personnel are to wear personal protective equipment appropriate to the work being performed.

- .2 The following personal protection is to be available on site in the event of a spill or leak:
 - .1 Non-powered half-face respirators with combined P100 and mercury vapour cartridge.
 - .2 Protective clothing.
 - .3 Rubber, nitrile or latex gloves.
- .3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

PART 2 PRODUCTS

2.1 Materials

- .1 Containment Drums: new metal pails or steel drums with removable steel lid. Drums shall be newly painted inside and out with bright white rust-resistant enamel.
- .2 Drum liners: clear polyethylene bag, 0.15mm thick.
- .3 Label: Mercury warning labels.
- .4 Lamp Storage Container: Cardboard box that lamps were originally packaged within, or plastic or cardboard totes for recycling lamps. Intent is to package lamps so that they are not broken during shipping. Container to be designed for lamps of that size.
- .5 Mercury Sponge: A plated metal-wool pad for the pick-up of mercury spills.
- .6 Mercury Vacuum: Nilfisk VT Mercury Vacuum or equal. Vacuum used to collect liquid mercury and granular mercury compounds with an internal HEPA filter and an activated carbon adsorbent filter to purify exhaust air of mercury vapours.
- .7 Neutralizing Agent: Mercon X or similar. Mercury neutralizing solution such as 20% calcium polysulfide or sodium thiosulphate.
- .8 TSP: Tri Sodium Phosphate, or other strong cleaner.

PART 3 EXECUTION

3.1 Equipment Removal

- .1 Prior to removing any fixtures or equipment, ensure associated services are isolated and de-energized.
- .2 Locate and remove the following materials designated to be disposed of:
 - .1 Fluorescent and mercury vapour lamps
 - .2 HVAC control systems, manometers, switches
 - .3 Thermostats
- .3 Place all mercury-containing equipment into containers to prevent breakage.

- .4 Provide an accurate inventory of the contents of each container including number of light tubes and lamps and an estimate of the total weight of the container in kilograms.

3.2 Packaging

- .1 Do not contaminate building surfaces with mercury.
- .2 Notify Owner's Representative of any spills immediately.
 - .1 Any spills of mercury are to be cleaned to the satisfaction of the Owner's Representative at the contractor's cost. This includes removal and replacement of building materials as required.
- .3 Install polyethylene drop sheets in packaging area to protect surfaces and finishes.
- .4 Package lamps in lamp storage containers. Do not break lamps.
- .5 Package mercury-containing equipment as follows:
 - .1 Place polyethylene liner in metal drum or pail.
 - .2 Carefully place mercury-containing equipment in pails, to prevent breakage.
 - .3 When full, or all items placed in container, seal liner bag with duct tape, seal lid, and place appropriate label on outside of container.

3.3 Emergency Response for Spills

- .1 For small spills:
 - .1 Evacuate area. Only personnel using the specified personal protective equipment are to be in spill area.
 - .2 Open windows or provide ventilation to area.
 - .3 Clean mercury and broken glass with mercury vacuum.
 - .4 Clean horizontal surfaces impacted by spill with TSP or approved alternative cleaner.
- .2 For large mercury spills:
 - .1 Evacuate area. Only personnel using the specified personal protective equipment are to be in spill area.
 - .2 Contact Owner's Representative immediately.
 - .3 Open windows or provide ventilation to area.
 - .4 Deactivate heat systems if they are adjacent and may aid in vaporization of mercury.
 - .5 If spill cannot be cleaned up immediately, apply neutralizing agent over mercury spill area.
 - .6 Collect mercury droplets together with a dustpan, squeegee or mercury vacuum.

- .7 Clean-up bulk mercury using aspirator bulb or mercury vacuum. Clean remainder with a mercury sponge. Place mercury in closed container (plastic or glass).
- .8 Porous surfaces are to be cleaned with Neutralizing Agent after clean-up of bulk mercury. Neutralizing Agent to be cleaned with mercury vacuum, or manufacturer's instructions.
- .9 If mercury spills into soil, carpet, through cracks, into drains etc. further removal of surface materials at contractor's cost will be required. Do not proceed without approval from Owner's Representative.
- .10 Clean horizontal surfaces impacted by spill with TSP or approved alternative cleaner.
- .11 Place all cleaning materials including drop sheets or polyethylene sheeting in containment drums.

3.4 Transportation and Reporting

- .1 Transport materials following Transportation of Dangerous Goods Act.
 - .1 Transport Mercury Materials and Waste to approved site for recycling, including mercury vapour in lamps, and ensure materials are recycled.
- .2 The facility used to process and recycle the mercury shall be approved by the Ministry of the Environment and Parks, and local jurisdictional authority, and shall have valid Certificates of Approval to carry out the work outlined herein.
 - .1 The facility must issue a Certificate of Recycling identifying types and quantities of materials generated from the project. The facility must also provide a Certificate of Recycling for the mercury generated from the project.
- .3 Provide the Abatement Consultant a copy of each waste manifest and or a letter from the recycling agency acknowledging receipt of the materials.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to the hazardous materials reports provided for the extent of the Abatement Work Areas.
- .2 Remove and dispose of the following materials as clean waste prior to abatement work:
 - .1 Carpet, thresholds, tack strips and underpad.
 - .2 Millwork and cabinets.
 - .3 Doors and door hardware.
- .3 Comply with requirements of this Section when performing the following Work:
 - .1 Drilling of holes in concrete or rock.
 - .2 Any operation at a project that requires handling of silica-containing material in a way that may result in a worker being exposed to airborne silica, and not defined in other sections.
 - .3 Entry into a dry mortar removal or abrasive blasting area while airborne dust is visible for less than 15 minutes for inspection and/or sampling.
 - .4 Working within 25 metres of an area where compressed air is being used to remove silica-containing dust outdoors.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of silica.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
- .2 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of silica exists.
- .2 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
- .3 Provide protective clothing for personnel entering the Abatement Work Area, including:
 - .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

- .1 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .2 Provide amended water for wetting, and an adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .3 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.
 - .1 Ensure safe installation of electrical lines and equipment.
- .4 Isolate Abatement Work Area with barrier tape located a minimum of 10 metres away from work being performed.
- .5 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a silica dust hazard.
- .6 Place required tools to complete the abatement within the Abatement Work Area.
- .7 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.

3.2 Maintenance of Abatement Work Area

- .1 Maintain Abatement Work Area in tidy condition.
- .2 Remove waste and debris frequently.
- .3 Remove standing water on floor at the end of every shift.

- .4 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Silica Handling

- .1 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .2 Wetting agents should be used where possible.
 - .3 Wet methods should not be used if it creates a hazard or cause damage to equipment or to project.
- .2 Power tools to be equipped with a shroud, and to be kept flush with surface.
- .3 Do not use compressed air to clean or remove dust or debris.
- .4 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .5 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.
- .6 Waste generated should be maintained wet until cleaned.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to the hazardous materials reports provided for the extent of the Abatement Work Areas.
- .2 Remove and dispose of the following materials as clean waste prior to abatement work:
 - .1 Carpet, thresholds, tack strips and underpad.
 - .2 Millwork and cabinets.
 - .3 Doors and door hardware.
- .3 Comply with requirements of this Section when performing the following Work:
 - .1 Removal of non-asbestos refractory materials with a jackhammer.
 - .2 Use of power tool to cut, grind, or polish concrete, masonry, terrazzo and refractory materials.
 - .3 Use of power tool to remove silica-containing materials.
 - .4 Tuckpoint and surface grinding.
 - .5 Dry mortar removal with electric or pneumatic cutting device.
 - .6 Dry method dust cleaning of abrasive blasting operations.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of silica.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
 - .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of silica exists.

- .2 Provide the following respiratory protection to all personnel, at minimum:
 - .1 Non-powered full-face respirators with P100 high efficiency (HEPA) cartridge filters.
 - .2 Full Face Powered Air Purifying Respirators (PAPR) with P100 high efficiency (HEPA) cartridge filters during
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Disposable protective clothing that does not readily retain dust or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.
- .2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.
- .3 Type C Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of polyethylene sheeting on each side of wall. Install 13 mm OSB, plywood or gypsum board over polyethylene sheeting on Occupied Area side. Paint Occupied Area side of plywood, OSB, or gypsum board with one coat of primer and one coat of flat white latex.
- .4 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Clean Room

- .1 Clean Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .2 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Clean Room.
- .3 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting on floor.
- .4 Install one layer of rip-proof polyethylene sheeting over roof.
- .5 Turn 600 mm of polyethylene down the sides over the polyethylene on the perimeter

walls.

- .6 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Clean Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .2 Provide amended water for wetting, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .3 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.
 - .1 Ensure safe installation of electrical lines and equipment.

3.2 Site Preparation –Enclosure

- .1 Install Curtained Doorways.
- .2 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .3 Install 6 mil polyethylene sheeting on walls to remain within the Abatement Work Area.
- .4 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.
- .5 Place required tools to complete the abatement with the Abatement Work Area.
- .6 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .7 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 15 minutes.
 - .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
 - .3 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.

- .4 Replace prefilters to maintain specified flow rate.
- .5 Replace HEPA filter as required to maintain flow rate and integrity of unit.
- .6 Discharge HEPA filtered negative air machines to building exterior, where possible.
 - .1 Direct discharge away from building access points.
- .8 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a silica dust hazard.
- .9 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.

3.3 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.4 Silica Handling

- .1 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .1 Wetting agents should be used where possible.
 - .2 Wet methods should not be used if it creates a hazard or cause damage to equipment or to project.
 - .2 Power tools to be equipped with a shroud, and to be kept flush with surface.
 - .3 Do not use compressed air to clean or remove dust or debris.
 - .4 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
 - .5 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.
 - .6 Waste generated should be maintained wet until cleaned.

END OF SECTION

Drumheller Institutional & Residential Demolitions Project
P0303-1568035704-44 (1.0)
Addendum No. :4

END OF ADDENDUM 04